5410 (085)
Mainline Thinning and Restoration Project
EA No. OR080-02-03

Dear Reviewer.

The Bureau of Land Management, Marys Peak Resource Area, invites you to review the attached Mainline Thinning and Restoration Project Environmental Assessment and Finding of No Significant Impact. This document describes the issues and analyzes the probable impacts to resources from the proposed project.

The proposed project is located in Township 14 South, Range 6 West, Sections 17 and 19, W. M., in the Upper Alsea and Marys River Watersheds southwest of Corvallis, Oregon. Commercial thinning and density management harvest would occur on approximately 212 acres of Matrix (General Forest Management Area) and Riparian Reserve using skyline cable and ground based yarding systems. Trees would be felled and left in place within 2 fish bearing streams, trees would be released to an open grown condition within Riparian Reserve and 2 acres of non-stocked Matrix land would be planted. The proposed actions are unlikely to impede and/or prevent attainment of the Aquatic Conservation Strategy objectives.

The goals of the project are to implement the recommendations of the *South Fork Alsea River Watershed Analysis* (November 1995) and the *Benton Foothills Watershed Analysis (September 1997)* by enhancing structural diversity, produce a sustainable supply of timber and increasing diameter growth to achieve future potential coarse woody debris and instream large wood sources more quickly than under current growth conditions.

We are interested in hearing from you. Please provide us with your comments by April 15, 2003. Please respond by then so a final decision can be made on the action. Comments specific to the alternatives and assessment of potential environmental effects would be the most helpful.

If you have questions about the environmental assessment, please call Phil Sjoding at (503) 315-5980. Please send your written comments to Field Manager, Marys Peak Resource Area, Salem District, Bureau of Land Management, 1717 Fabry Road S.E., Salem, Oregon, 97306.

Sincerely,
Cindy Enstrom
Cindy Enstrom
Field Manager
Marys Peak Resource Area

* Note -Comments, including names and addresses of respondents, will be available for public review at the same time as the EA during regular business hours (7:30 a.m. to 4:00 p.m.), Monday through Friday, except holidays. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations of businesses, will be made available for inspection in their entirety.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SALEM DISTRICT OFFICE
MARYS PEAK RESOURCE AREA

ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT FOR MAINLINE THINNING AND RESTORATION PROJECT

EA NUMBER: OR-080-02-03
PREPARED BY: Phil Sjoding, Interdisciplinary Team Lead

Summary: This document is an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for the proposed Mainline Thinning and Restoration Project. The project area is located in Township 14 South, Range 6 West, Sections 17 and 19 Willamette Meridian, Benton County. The land use allocations are Matrix (General Forest Management Area) and Riparian Reserve.

Alternative 1, the proposed action, would include commercial thinning, density management of Riparian Reserves, reduction of landing logging debris, road construction, road renovation, stream and aquatic enhancement, site preparation and conifer planting. The project would remove approximately 1,600 thousand board feet (1,600 MBF) of timber from approximately 212 acres of 50 to 60 year-old forest. Approximately 90 acres of Matrix (GFMA) and 122 acres of Riparian Reserves would be thinned. This action would involve timber harvest using cable skyline and ground-based yarding systems. Approximately 3,200 feet of new road construction and 6,400 feet of road renovation is proposed.

Alternative 2, is the "No Action" alternative: proposed actions would be deferred. Forest Management would continue as described in the Salem District Resource Management Plan.

Alternative 3, the tractor yarding seasonal restriction change would change the seasonal restriction dates for tractor yarding from between August 1 and October 15 to between July 15 and October 15.

Alternative 4, the deletion of tractor swing yarding area would remove approximately 2 acres of thinning from the harvest area.

The environmental analysis focuses on the following environmental features identified by an interdisciplinary team of BLM resource specialists:

> Vegetation/Botany: Effects on attaining silvicultural objectives for GFMA lands. Effects on native plant species. Effects on Special Status Species or SEIS Special Attention Plant Species. Effects on spread of noxious weed species.
>
> Soils: Effects on long-term soil productivity.

Fuels: Effects on fuel loading and fire risk and air quality.

Water: Effects on stream flow, channel conditions, and water quality. Effects on the attainment of Aquatic Conservation Strategy objectives.

Riparian: Effects on long term instream large wood recruitment.

Fisheries: Effects on resident and anadromous fish and the aquatic habitat.

Wildlife: Effect on special status species, special attention species and on wildlife habitats.

For further information, contact Phil Sjoding (503-315-5980), 1717 Fabry Rd. S.E., Salem, Oregon, 97306. Comments on this environmental assessment are due April 15**,** 2003.

FINDING OF NO SIGNIFICANT IMPACT

INTRODUCTION

The Bureau of Land Management (BLM) has analyzed the potential effects of timber harvest, density management and road construction activities in the upper drainages (Township 14 South, Range 6 West, Sections 17 and 19) of the Marys River and Upper Alsea River Watersheds, Marys Peak Resource Area. The actions described in the EA for the Mainline thinning are proposed for the intent of meeting the need for forest products and forest habitat as described in the *Salem District Resource Management Plan* (RMP, 1995, pp. 1 and 2). The EA is attached to and incorporated by reference in this FONSI determination.

This FONSI and the EA will be made available for public review prior to making a decision on the action. The public notice of availability for review will be published in the *Corvallis Gazette Times* and through notification of individuals, organizations, and state and federal agencies with affected interests. They will also be available for review on the internet at this address: http://www.or.blm/salem/ (planning).

Finding of No Significant Impact Determination

Based on the analysis of information in the attached EA, my determination is that a new environmental impact statement (EIS) or supplement to the existing *Final Environmental Impact Statement* (FEIS, September 1994) are unnecessary and will not be prepared.

Comments regarding this environmental assessment should be received by the Bureau of Land Management, Marys Peak Resource Area, by April 15, 2003.

Finding Rationale:

Under the alternatives analyzed, significant impacts on the quality of the human environment would not occur based on the following criteria:

1. The alternatives are in conformance with the following documents which provide the legal framework for management of BLM lands in the Marys Peak Resource Area:

-*Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M ROD, January 2001), the *2001 Annual Species Review* (Table 1-1, attached) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000).

- *Salem District Record of Decision and Resource Management Plan* (RMP, May 1995).

- *Salem District Proposed Resource Management Plan/Final Environmental Impact Statement* (PRMP/FEIS, September 1994).

- *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (ROD, April 1994) and the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (SEIS, February 1994).

2. The action would be consistent with the Aquatic Conservation Strategy Objectives and promote development of older forest characteristics in the Riparian Reserves (See Appendix B-1, "Aquatic Conservation Strategy Objectives Review Summary"). The following table shows how this action relates to required components of the Aquatic Conservation Strategy (*RMP*, pp. 5-7):

RELATIONSHIP OF ALTERNATIVES TO RELEVANT MANAGEMENT DIRECTION

Component	Relationship of This Action
Riparian Reserves	Alt. 1 (Proposed Action): Density management, road construction and restoration work would occur within Riparian Reserves. Roads would be located on stable sites, primarily on ridgetops .
Key Watersheds	Not in a Key Watershed.
Watershed Analysis	The first iterations of the *South Fork Alsea*, and *Benton Foothills* watershed analyses were completed in 1995 and 1997. This proposed action was specifically designed to respond to several resource issues identified in these watershed analyses. Many of the recommendations identified in the analyses have been incorporated into this proposed action including: density management within Riparian Reserves, and future large wood recruitment into stream channels.
Watershed Restoration	Thinning portions of Riparian Reserves would restore structural diversity and complexity of understory components. Felling trees in streams would trap sediment, reduce stream gradients and improve fish habitat. Releasing deep crowned limby trees ("wolf trees") from competition in younger stands within Riparian Reserves would maintain their characteristics.
ACS Objectives	Effects to resources described in the ACS Objectives (stream physical integrity, water quality, sediment regime, in-stream flows, species composition, etc.) are addressed in the Environmental Consequences section of the EA.

3. The alternatives are consistent with other federal agency and state of Oregon land use plans and with the Benton County land use plan and zoning ordinances. Any permits associated with the implementation of this project would be obtained and requirements would be met.

4. There are no floodplains, or prime or unique farmlands within the sale area.

5. No known cultural or paleontological resources occur in the project area. A post-harvest survey would be done upon completion of the project according to *Protocol for Managing Cultural Resources on Lands Administered by the BLM in Oregon*; Appendix D dated August 5, 1998.

6. To comply with Section 7 of the Endangered Species Act (ESA), the Mainline Thinning and Restoration Project was submitted for consultation with the USFWS as part of the *Programmatic Biological Assessment in the North Coast Province for Fiscal Year 2003-2004 Projects Which Would Modify the Habitats of Bald Eagles, Northern Spotted Owls, and Marbled Murrelets.* This consultation was concluded with the USFWS issuing a Biological Opinion (BO; tracking number 1-7-02-F-956, July 24, 2002). The BO determined that the level of any anticipated incidental take is not likely to result in jeopardy to the bald eagle, northern spotted owl, or marbled murrelet. All applicable terms and conditions of this BO have been incorporated as design features of this proposed project.

7. To comply with Section 7 of the Endangered Species Act (ESA), the Mainline Thinning and Restoration Project was submitted for consultation with the National Marine Fisheries Service (NMFS). The Level 1 Team that assesses potential impacts to listed fish determined that the proposed project is a "Not Likely to Adversely Affect" Oregon coast coho salmon. The Biological Assessment was submitted to the National Marine Fisheries Service (NMFS) during January of 2003**.** The Letter of Concurrence was received from NMFS on February 21, 2003 with the determination that the proposed project is Not Likely to Adversely Affect Oregon Coast coho salmon. Any decision on the proposed Mainline Thinning and Restoration Project would be in compliance with the Letter of Concurrence.

8. The proposed action is within the coastal zone as defined by the Oregon Coastal Management Program. This proposal is consistent with the objectives of the program, and the state planning goals that form the foundation for compliance with the requirements of the Coastal Zone Act. Management actions/direction found in the RMP were determined to be consistent with the Oregon Coastal Management Program.

9. No hazardous materials or solid waste would be created by the proposed action. Any chemicals or fuel used on the site would be handled according to the best management practices (RMP, Appendix C).

10. The sale area does not qualify for potential wilderness nor has it been nominated for an Area of Critical Environmental Concern.

11. Project design features would assure that potential impacts to water quality would be in compliance with the State of Oregon In-stream Water Quality Standards and thus the Clean Water Act.

12. The smoke generated from burning piles would be within the standards set by the Oregon Smoke Management Plan. This plan considers national air pollution standards and complies with the Clean Air Act.

13. In accordance with the RMP (see pp. 21-22), the amount of late successional forest (i.e., 80 years and older) on federal lands was determined for the Marys River Watershed and the Upper Alsea Watershed. The 80+ forest age classes occur on approximately 37 percent of the federal lands in the Marys River Watershed and on approximately 37 percent of the federal lands in the Upper Alsea Watershed. This exceeds the RMP standard of 15 percent. No late-successional forest stands would be affected by this action.

14. Public health and safety were not identified as an issue. The proposed action is comparable to other timber management and riparian treatment projects that have occurred within the Salem District with no unusual health or safety concerns.

15. The environmental analysis shows that the effects of the proposed action on the quality of the human environment are not highly controversial.

16. The proposed action is not unique or unusual. The BLM has experience implementing similar actions in similar areas. There are no predicted effects on the human environment that are considered to be highly uncertain or involve unique or unknown risks.

The actions are local in nature; potential adverse impacts would be short-term. Impacts were determined based on research, observation, professional training, and experiences by the inter-disciplinary team of natural resource specialists. The design features identified in the EA would assure that no significant site-specific nor cumulative impacts would occur to the human environment other than those already addressed in the Survey and Manage SFEIS, FEIS and SEIS.

Prepared By: Gary L Hundrud for PS — 3/14/03
Phil Sjoding, IDT Leader — Date

Reviewed By: Carolyn Sands — 3/14/03
Carolyn Sands, National Environmental Policy Act (NEPA) Coordinator — Date

Approved By: Cindy C Enstrom — 3/14/03
Cindy Enstrom — Date
Marys Peak Field Manager

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ENVIRONMENTAL ASSESSMENT

I. PURPOSE AND NEED

A. Introduction

The proposed project is located in Sections 17 and 19, T.14 S., R. 6 W., W. M., Benton County, within the Marys River and Upper Alsea River fifth field watersheds (see General Vicinity Maps in Appendix A-1). The project area is approximately sixteen miles southwest of the city of Philomath. The actions would occur on lands classified as Matrix (GFMA) and Riparian Reserves in the RMP (see page 20 of RMP for Matrix and page 10 for Riparian Reserves). The Matrix land use allocation allows for harvesting of trees while retaining important ecological components of forest stands. The Riparian Reserve land use allocation provides for maintaining or enhancing the Aquatic Conservation Strategy Objectives that are listed on pages 5 and 6 of the RMP and Appendix B-2 of this EA. The following projects will be covered in this EA: Project 1 (Commercial thinning and Density Management), Project 2 (Bed load trapping and stream gradient reduction), Project 3 (Releasing wolf trees), Project 4 (Fish habitat enhancement), and Project 5 (site preparation and conifer planting).

B. Purpose and Need

Project 1 (Commercial thinning and Density Management)

The action described and analyzed herein is proposed for the purposes of meeting the need for forest products and forest habitat as described in the RMP, (1995 pp. 1 and 2). The proposed project would provide a supply of timber and other forest products that would help maintain the stability of local and regional economies. The proposal would also provide for retention of important ecological components within the forest management area. The project would accomplish road restoration and riparian enhancement in a manner that meets the Aquatic Conservation Strategy Objectives outlined in the Northwest Forest Plan (1994).

The objectives of the Matrix thinning area is to remove those trees likely to die in the future due to increasing stand densities and to concentrate the sites' productivity on fewer stems, resulting in a timber product now and in a higher quality end product. This would be reflected in future higher product value for the public.

Approximately 140 acres of the proposed project is classified as Riparian Reserves as described on page 9 of the RMP. Riparian Reserves are the portions of the watershed required for maintaining hydrologic, geomorphic, and ecological processes that directly affect streams, stream processes, and fish habitats. They are also designed to provide travel corridors and resources for both riparian dependant and other riparian and/or late-successional associated plants and animals. Both the ROD and the RMP support thinning young to mid-age Riparian Reserve stands to increase individual tree size. The *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl,(April 1994)* says “active silvicultural programs will be

necessary to restore large conifers in Riparian Reserves. Appropriate practices may include...thinning densely-stocked young stands to encourage development of large conifers..." (p. B-31) The *RMP* directs us to "Apply silvicultural treatments to restore large conifers in Riparian Reserves" (p. 7) and "apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives" (p. 11).

Units 19A, 19B and a portion of Unit 17A are located in the Upper Alsea River fifth field watershed and in the Peak Creek sixth field watershed. The BLM portion of the Upper Alsea River watershed was analyzed in the *South Fork Alsea Watershed Analysis, (SFAWA,* November, 1995). The *SFAWA* (p. 79 and Map 15) identified portions of the proposed project area as a potential treatment area. Although portions of the project area within the area analyzed by *SFAWA* weren't specifically recommended for treatment, the *South Fork Alsea Watershed Analyses Riparian Reserve Treatment Recommendations Update*, *(RRTRU*, May, 2000), recommends density management after site specific analysis on stands exhibiting characteristics similar to those in the proposed project area (p.5-6 and Table 2, p.7). The watershed lacks adequate large woody debris potential for streams (*SFAWA*, p.65) and lacks snags, down wood, sub-canopy layers and species diversity (*SFAWA*, p. 40).

Unit 17B and the remaining portion of Unit 17A are located in the Marys River fifth field watershed. No treatments within the Riparian Reserves are planned in the Marys River fifth field watershed.

The goal of this project in the Riparian Reserves would be to maintain forest health and to begin the development of older forest characteristics. The proposed project as the first stage in this process, would accelerate diameter growth, maintain crown ratios, begin a second canopy layer and maintain species diversity. Understory conifers would be planted if there is appropriately large openings, which would eventually become a second canopy layer. The second stage would occur when the uplands were harvested and would emphasize release of understory conifers, creation of large diameter coarse woody debris (CWD) and snags, and enhancement of variable spacing.

Project 2 (Bed load trapping and stream gradient reduction)

The purpose of this project is to increase fish passage through the culvert on road 14-6-19.

Project 3 (Releasing wolf trees)

The purpose of this project is to release trees in Riparian Reserve in the stand between Unit 19C and Peak Creek. Releasing these trees to an open grown condition would increase crown ratios and maintain branches on the largest trees enhancing habitat for riparian and/or late successional species.

Project 4 (Fish habitat enhancement)

The purpose of this project is to promote complex and diverse habitat types for fish in the tributary stream in Unit 19A. The majority of current LWD in this stream is older wood. Dropping trees in

this stream would add a supply of new wood that would allow habitat types to increase in complexity and diversity for resident fish.

Project 5 (Site preparation and conifer planting)

The purpose of this project is to restock 2 acres of nonstocked land in Matrix land use allocation with a mixture of Douglas-fir, western hemlock and western red cedar.

C. Tiering

This environmental assessment (EA) is tiered to the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M ROD, January 2001) *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000). The S&M ROD amends a portion of the Northwest Forest Plan by adopting new standards and guidelines for Survey and Manage, Protection Buffers and other mitigating measures.

This environmental assessment (EA) is also tiered to the *Salem District Record of Decision and Resource Management Plan* (RMP May, 1995) and the *Salem District Proposed Resource Management Plan/Final Environmental Impact Statement* (PRMP/FEIS, September 1994). The FEIS analyzed broad scope issues and impacts within the Northwest Forest Plan's direction to meet the need for forest habitat and forest products (p. 1). The RMP provides a comprehensive ecosystem management strategy for BLM-managed lands in the Salem District in strict conformance with the Northwest Forest Plan and the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (April 1994).

This environmental assessment is also tiered to the *Western Oregon Program-Management of Competing Vegetation Final Environmental Impact Statement* (VMFEIS, February 1989) and the *Western Oregon Program-Management of Competing Vegetation Record of Decision* (August 1992). The VMFEIS analyzed broad scope issues and impacts for an integrated vegetation management strategy consisting of various treatments. The Record of Decision identifies treatments and provides processes to meet vegetation management objectives (p. 3) and resource management goals (p. 33). This EA will analyze vegetation management treatments such as release treatments promoting survival and growth of desired vegetation.

This EA is also tiered to the *Northwest Area Noxious Weed Control Program Final EIS* (USDI, 1985) and the associated *Record of Decision* (USDI, April 7,1986), and the *Supplement to the Northwest Area Noxious Weed Control Program* (USDI, March 1987) and its associated *Record of Decision* (May 5, 1987). This EA will analyze vegetation management treatments such as site preparation and reforestation in the proposed project area.

The above documents are available for review in the Salem District Office. Additional information about the proposed Mainline Thinning project is available in the Mainline Thinning Project EA file.

D. Management Objectives

The following general objectives guided the development of alternatives for this proposed project:

Matrix (General Forest Management Area, p. 20) (Projects 1 and 5)

1. Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.
2. Provide connectivity (along with other allocations such as Riparian Reserves) between Late Successional Reserves.
3. Provide habitat for a variety of organisms associated with both late-successional and younger forests.
4. Provide for important ecological functions such as dispersal of organisms, carry-over of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees.
5. Provide early successional habitat.

Riparian Reserves (p. 9) (Projects 1, 2, 3, 4)

1. Meet Aquatic Conservation Strategy Objectives.
2. Provide habitat for special status/attention and other terrestrial species.

Air Quality (p. 22) (All Projects)

1. Maintain and enhance air quality in a manner consistent with the Clean Air Act and the State of Oregon implementation plan**.**

Water and Soil Resources (p. 22) (All Projects)

1. Comply with state water quality requirements to restore and maintain water quality and to protect recognized beneficial uses in watersheds.
2. Improve and/or maintain soil productivity.

Special Status and SEIS Special Attention Species (p. 28)

1. Protect, manage and/or conserve habitat for these species so as to not elevate their status to any higher level of concern.

2. For this year, design timber sales that are a no-affect or a may affect, not likely to adversely affect listed anadromous fish species as defined by the endangered species act.

Wildlife/Fish Habitat (pp.24-28)

The project would be designed to improve conditions for wildlife and fish in LSRs, and would meet Aquatic Conservation Strategy objectives in Riparian Reserves.

Visual Resources (p. 36)

Project area is located within Visual Resource Management Class IV lands that would allow management activities to dominate the view. Manage moderate levels of change to the existing characteristic landscape of the project area.

Rural Interface Areas (p. 39)

The Project area would be outside Rural Interface Areas with the closest residence approximately 4 miles from the project area.

E. Scoping and Issues

Public involvement efforts during the scoping process included the following:

- The general area was shown as Matrix and Riparian Reserve in the Northwest Forest Plan and the RMP. These documents were widely circulated in the state of Oregon and elsewhere, and public review and comment were requested at each step of the planning process.

- A description of the proposal was included in Salem Bureau of Land Management *Project Update* issues mailed in July 2002 and January 2003 to more than 1200 individuals and organizations on the mailing list.

- A scoping letter was mailed to adjacent landowners and interested parties on March 21, 2002, requesting identification of issues to be addressed in this EA.

- A news release announcing availability of the EA for public review and comment will be submitted to the *Corvallis Gazette-Times*.

- Copies of the EA are being mailed to individuals, interest groups and agencies.

- The EA and FONSI will be available for review at the Salem District Office and on the internet at Salem BLM's website, http://www.or.blm/salem (under planning)

Issue 1. Timber Marketability

Some members of the IDT expressed concerns about adverse effects to the marketability of the timber due to the time period length of ground based yarding. Alternative 3 was developed to feasibly allow ground based yarding an additional 15 days per year. This additional time would coincide with the seasonal yarding restriction date due to high sap flow.

Issue 2. Water Quality

A member of the IDT expressed concerns about adverse effects on water quality due to tractor swing yarding within 2 acres of Riparian Reserve..

Alternative 4 was developed to delete approximately 3 acres of commercial thinning in harvest unit 19C to further reduce potential adverse effects on water as compared to the design features and mitigation measures incorporated into Alternative 1, the Proposed Action.

Design features and mitigation measures to protect water quality are incorporated into Alternatives 1, 3 and 4 and are described in Chapter II.

II. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

A. INTRODUCTION

This section describes the proposed action and alternatives identified by the interdisciplinary team that developed the Mainline Thinning project proposal. There are 3 action alternatives and a no action alternative. Forest management treatments incorporated in the proposed action and alternatives conform to standard practices and general design features intended to reduce the environmental effects of timber harvest and related activities. They comply with the Standards and Guidelines specified in Appendix A of the ROD and Best Management Practices (RMP, Appendix C).

Environmental Features

The following environmental features concerning the proposed action were identified by an ID team of BLM natural resource specialists representing various fields of science (see Section V, Interdisciplinary Team Members): These environmental features will be discussed in Chapters II and III. Additional environmental features are discussed in Appendix C-1.

Vegetation/Botany: Effects on attaining silvicultural objectives for GFMA lands. Effects on native plant species. Effects on Special Status Species or SEIS Special Attention Plant Species. Effects on spread of noxious weed species.

Soils: Effects on long-term soil productivity.

Fuels/Air Quality: Effects on fuel loading and fire risk and air quality.

Water: Effects on stream flow, channel conditions, and water quality. Effects on the attainment of Aquatic Conservation Strategy objectives.

Riparian: Effects on long term instream large wood recruitment.

Fisheries: Effects on resident and anadromous fish and the aquatic habitat.

Wildlife: Effect on special status species, special attention species and on wildlife habitats.

B. SUMMARY OF ALTERNATIVES

Alternative 1: Proposed Action

Project 1 (Commercial Thinning and Density Management)

The proposed action includes commercial thinning on approximately 90 acres in Matrix (otherwise known as General Forest Management Areas [GFMA, RMP, p.20]) density management and coarse woody debris on 122 acres in Riparian Reserves (RMP, p.11) , new road construction and road renovation. If sufficient funding is available, a few trees would be felled into Peak Creek in order to create a jam below a culvert that currently has a small step, approximately 25 trees with the best crown ratios and largest limbs would be released to an open grown condition within the project 3 area, approximately 4 trees per 1,000 feet would be felled into the fish bearing stream in Unit 19A to enhance fish habitat and cutting some big leaf maple stems, scalping planting spots and brushing a six foot radius around the planting spots on approximately three acres in Matrix. Following site preparation the area would be planted with a mixture of Douglas-fir, western hemlock and western red cedar.

Thinning and density management would occur through two timber sales (Dawson Creek and Mainline thinning). Trees 50 to 60 years old would be skyline yarded on approximately 119 acres, ground-based yarded on approximately 90 acres and tractor swing yarded on approximately 3 acres. Approximately 3,200 feet of new road construction and 6,400 feet of road renovation would occur to access the harvest area. The new road construction would be blocked and winterized following completion of harvest.

Project Design Features

Project design features are operating procedures that would be included in the design and implementation of the proposed action alternative. They also include measures proposed to mitigate adverse environmental effects. The design features of this proposal are described below. All acres and other numerical units are approximate (See Appendix A-2, EA Map).

1. Vegetation

- The Matrix (GFMA) portions of the proposed units would be thinned to the following average densities:

Unit	Basal Area (BA) (square feet/acre)	Trees/Acre
17A	160	58
17B	180	105
19A	110	77
19B (including special marks)	140	87
19C	160	107

- Priorities for tree marking would be based on Marking Guidelines contained within the Silvicultural Prescription (see Silvicultural Prescription in NEPA file).

- In the Matrix portions of all units, species diversity would be maintained by reserving hardwoods greater than 10 inches D.B.H., western hemlock (except for unit 19B where western hemlock would be favored for cutting over Douglas-fir), and western red cedar except for road rights-of-way (ROWs) or for safety reasons.

- In unit 17A, a genetically superior tree would be reserved. In addition one or two trees adjacent to the plus tree would be reserved to provide a buffer during logging operations.

- Riparian Reserve portions of the proposed units would be thinned to the following densities:

Unit	Basal Area (square feet)	Trees/Acre
17A	150-170	50-65
19A	100-120	65-90
19B	130-150	80-100
19C	150-170	100-120

- Priorities for tree marking would be based on Riparian Reserve Marking Guidelines (see Riparian Report in NEPA file).

- To preserve species diversity, except for road rights-of-way (ROW's) or for safety reasons, all species except Douglas-fir would be reserved in the Riparian Reserve portion of units 17A, 19A and 19C. In the Riparian Reserve portion of unit 19B all species except Douglas-fir and western hemlock would be reserved, with Douglas-fir being the highest priority to be reserved.

- Within the units inside Riparian Reserves, approximately one green tree per acre would be utilized during harvest operations to create snags/down logs. Trees to be utilized for snag/down log creation would be stand average or larger diameter breast height (DBH). The priority for snag/down log creation would be to use trees from yarding corridors or tail trees if available.

- All open grown "wolf trees", existing snags which are greater than 12 inches DBH and all coarse woody debris would be reserved, except within road rights-of-way (ROW's), or for safety reasons. The size and condition of coarse woody debris would be monitored after three years of exposure to windthrow and bark beetles. Where appropriate additional snags and /or down wood would be created according to the recommendations of the wildlife biologist.

- Management of Survey and Manage Species found as a result of inventories would be accomplished in accordance with the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M ROD, January 2001) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000) and 2002 Annual species review table 1-1, (June 2002) (see Appendix B-3).

- Management of all survey and manage known sites located within the proposed project area would be accomplished in accordance with management direction listed on pages 8 through 14 of the standards and guidelines S&M ROD, January 2001. All of the known sites would be withdrawn from any timber harvesting activity.

- All known sites of any special attention vascular plant, lichen, bryophyte and fungi species within the proposed project area previous listed in the Northwest Forest Plan which are included in 2002 Annual species review, Table 1-2, (June 2002) *Species Removed from Survey and Manage, Protection Buffers and Protect From Grazing in all of Part of Their Range*, page 53, *S&M ROD*, would not receive any special protection from this thinning operation (see Appendix J).

2. Yarding

<u>Ground based yarding (approximately 90 acres in Units 17A, 19A and 19C)</u>

- Yarding with ground-based equipment would be restricted to periods of low soil moisture, generally between August 1 and October 15**.**

- Ground based yarding with either crawler tractors or harvester/forwarders may be done on slopes less than 35 percent in Unit 19A. Ground based yarding with crawler tractors may be done on slopes less than 35 percent in Unit 17A.

- Crawler tractor use would require utilization of pre-designated skid trails spaced at least approximately 150 feet apart and utilize existing skid trails as much as practical.

- Harvester/forwarder use would require that logs would be transported free of the ground. The equipment would be either rubber tired or track mounted, and have rear tires or tracks greater than 18 inches in width. Yarding corridors would be spaced approximately 60 feet apart and be less than 15 feet in width. Logging debris would be placed in yarding corridors in front of equipment to minimize the need for machines to go on bare soil.

- Waterbars would be constructed where they are determined to be necessary by the Authorized Officer.

- Special marked trees adjacent to unit 19B would be drum-line yarded to existing roads using a ground-based system.

- In the tractor swing yarding area, yarding would be done with crawler tractors utilizing one pre-designated skid trail approximately 600 feet which would be constructed and follow a ridge top. The tractor swing yarding road would be constructed on a ridge top. All logs within the tractor swing yarding area would be tractor yarded to a point where they can be feasibly skyline yarded along with other logs in unit 19C. Crawler tractor access to the tractor swing yarding area would be with one pass in and one pass out from existing or new construction roads. Immediately following completion of swing yarding operations, the swing skid road would be winterized by applying the following treatments:

    - Where possible, any berm along the outside edge on the skid trail that may prevent water from draining off the road surface in an outslope fashion would be removed.

    - Diagonal waterbars across the skid road at a spacing not to exceed 50 feet would be constructed. The existing topography would be utilized to locate water bars where they would survive, function and drain as intended.

    - Slash and debris would be placed across the exposed soil areas of the skid road to absorb future rainfall impact.

<u>Skyline Yarding (approximately 119 acres, in Units 17B, 19A, 19B and 19C)</u>

- Logs would be yarded with a skyline cable system on approximately 140 acres (58 percent of total harvest area) a ground-based system on approximately 97 acres (40 percent of the total harvest area) and tractor swing yarded on approximately 3 acres (2 percent of the total harvest area).

- With the exception of road right of ways, all yarding would be restricted to periods of low sap flow, generally between July 15 of one calendar year and April 15 of the next.

- In the skyline yarding area, one end suspension of logs would be required over as much of the area as possible to minimize soil compaction, damage to reserve trees, and disturbance. Yarding corridors would average approximately 150 feet apart where they intersect boundaries and be 15 feet or less in width. Lateral yarding up to 75 feet from the skyline using an energized locking carriage would be required.

3. Road and Landing Construction, Road Management

- Approximately 3,200 feet of new roads, located predominantly on or near ridge top locations, would be constructed. All of these roads would be surfaced and outsloped in order to provide for all season hauling.

- Following harvest the new construction would be blocked and winterized. Winterizing would include out sloping for drainage, the construction of waterbars and grass seeding.

- Approximately 6,400 feet of existing road would be renovated. This work may include brushing, blading, minimal excavation, upgrading drainage structures and tree removal or applying rock surfacing.

- In order to limit soil erosion, road construction would be restricted to periods of low precipitation (generally May through October).

- Timber haul would occur to the east out the Weyerhaeuser Mainline road system in order to reduce potential impacts of sedimentation to the Upper Alsea watershed. Timber hauling would be allowed year-round on rock surfaced roads. In periods of high rain-fall, the contract administrator may restrict log hauling to minimize water quality impacts, and/ or require the Purchaser to install silt fences, barkbags or apply additional road surface rock.

4. Soils

- Areas of exposed soil within all new road construction and on ground-based yarding roads and landing locations would be seeded with Oregon certified (blue tagged) red fescue at a rate equal to 40 pounds per acre. The extent of soil disturbance would be determined in cable yarding corridors at the completion of yarding. If extensive, these areas would be seeded.

- Soils management design features are listed under the Yarding and Roads sections.

5. Fuels/Air Quality

- Debris cleared during road construction would be scattered along the length of rights-of-way. Large accumulations and piles of debris that may later pose higher than necessary fire hazards would be avoided.

- Debris accumulations on landings and along roads would be machine piled, covered with plastic and burned under favorable smoke dispersal conditions in the fall, in compliance with the State smoke management plan.

- In order to mitigate fire risk the area would be monitored for the need of closing or restricting access during periods of high fire danger. During the closed fire season the first year following harvest activities, while fuels are in the "red needle" stage, the entire area would be posted closed to all off road motor vehicle use.

6. Water/Fish/Riparian

- Stream Protection Zones would be established along all streams and identified wet areas within the harvest area. These zones would be identified as "Stream Protection Zones" (Reference Appendix A-3 "Criteria for Identifying "Stream Protection Zones").

- To protect water quality, trees would be felled away from all stream protection zones within the harvest area. Where a cut tree does fall within a stream protection zone, the portion of the tree within the stream protection zone would remain in place. No cutting or yarding would be permitted in or through all stream protection zones within the harvest area.

- Density management treatments would be applied inside of Riparian Reserves as appropriate for enhancing late-successional forest structure, while avoiding ground disturbance that could impact adjacent water courses.

7. Wildlife

- Management of Survey and Manage Species found as a result of inventories would be accomplished in accordance with the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (*S&M ROD*, January 2001) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (*S&M FSEIS*, November 2000) and 2002 Annual Species Review Table 1-1, (June 2002).

- Management of all survey and manage known sites located within the proposed project area would be accomplished in accordance with management direction listed on page 49 of the standards and guidelines S&M ROD, January 2001. All of the known sites would be withdrawn from any timber harvesting activity and would minimize any soil disturbance and protect the known site micro-climate. All sites would be buffered by a minimum 110 foot radius no-entry buffer. Inside the area to be site prepped and planted this would mean protecting individual maple clumps where known sites are located.

- Conduct harvest operations and associated activities in conformance with the applicable Biological Opinion (# 1-7-02-F-958) concerning listed wildlife species. Pertinent Terms and Conditions for this BO include:

- A daily use restriction on the operation of mechanized equipment would be required from April 1 through September 15, where equipment use would be restricted to the time period beginning two hours after sunrise and ending two hours before sunset within all units;

- The Resource Area Biologist would be notified if any federally listed wildlife species are found occupying stands proposed for treatment during project activities.

8. Special Forest Products

- Special forest product permits for floral greenery, such as Oregon grape, sword-fern, and salal, and transplants such as vine maple, would be available by permit before and after harvest operations as appropriate for LSR and Riparian Reserve designated lands in this portion of the Marys Peak Resource Area.

- If firewood is present on the landings after completion of the logging contract, permits may be made available to the public. Prescribed burning would be delayed one or more seasons in order to accommodate firewood cutting.

9. Cultural Resources

- No known cultural or paleontological resources occur in the project area. A post-harvest survey would be done upon completion of the project according to *Protocol for Managing Cultural Resources on Lands Administered by the BLM in Oregon*; Appendix D dated August 5, 1998. If any sites are identified during timber harvesting, the operations would be immediately halted and the Field Manager would be notified. Operations would be resumed only with the Field Manager's approval, and only after appropriate mitigation measures were designed and implemented to provide any needed protection of those resources.

10. Visual, Recreation, and Rural Interface Resources

- No design features are proposed specifically for visual resources.

- No design features are proposed specifically for recreation.

- No design features are proposed specifically for rural interface.

Summary of Seasonal Restrictions

The following is a summary of seasonal restrictions:

Management Activity	Rationale	Generally No Activity Between These Dates
Falling, yarding	Bark Slippage	April 15 to July 15
Power Equipment	Noise Disturbance	Daily beginning 2 hours before sunset and ending 2 hours after sunrise (April 1 to September 15)
Road Construction	Soil Erosion	October 1 to May 1
Ground-based yarding,	Soil Compaction	October 15 to August 1

PROJECTS 2-5

The following projects may be accomplished subject to available funding and workload:

Project 2 (Bed load trapping and stream gradient reduction)

The proposed action includes felling approximately 4 trees into Peak Creek in order to create a jam below a culvert that currently has a small step. This culvert is located at approximately the east side of the junction of roads 14-6-17 and 14-6-19. Creating this small jam would slow stream velocity and allow material to settle in front of the culvert.

Project 3 (Releasing wolf trees)

The proposed action includes releasing deep crowned limby trees ("wolf trees") from all competition in the younger stand between Unit 19C and Peak Creek in order to maintain their characteristics.

Project 4 (Fish habitat enhancement)

The proposed action includes felling approximately 4 trees per 1,000 feet into the fish bearing stream in Unit 19A to enhance fish habitat.

Project 5 (Site preparation and conifer planting)

The proposed action includes cutting some Big Leaf maple stems, scalping planting spots and brushing a six foot radius around the planting spots on approximately three acres in Matrix. Following site preparation the area would be planted with a mixture of Douglas-fir, western hemlock and western red cedar.

PROJECT DESIGN FEATURES COMMON TO PROJECTS 2, 3, 4 and 5

1. Vegetation

- Management of Survey and Manage Species found as a result of inventories would be accomplished in accordance with the *Record of Decision and Standards and Guidelines*

for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (S&M ROD, January 2001) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000) and 2002 Annual species review table 1-1, (June 2002) (see Appendix B-3).

- Management of all survey and manage known sites located within the proposed project area would be accomplished in accordance with management direction listed on pages 8 through 14 of the standards and guidelines S&M ROD, January 2001. All of the known sites would be withdrawn from any timber harvesting activity.

2. Wildlife

- Conduct harvest operations and associated activities in conformance with the applicable Biological Opinion (# 1-7-02-F-958) concerning listed wildlife species. Pertinent Terms and Conditions for this BO include:

  - A daily use restriction on the operation of mechanized equipment would be required from April 1 through September 15, where equipment use would be restricted to the time period beginning two hours after sunrise and ending two hours before sunset within all units;

  - The Resource Area Biologist would be notified if any federally listed wildlife species are found occupying stands proposed for treatment during project activities.

- Management of Survey and Manage Species found as a result of inventories would be accomplished in accordance with the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M ROD, January 2001) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000) and *Table 1-1, Species Included in Survey and Manage Standards and Guidelines and Category Assignment* (June 2002).

- Management of all survey and manage known sites located within the proposed project area would be accomplished in accordance with management direction listed on page 49 of the standards and guidelines S&M ROD, January 2001. All of the known sites would be withdrawn from any timber harvesting activity and would minimize any soil disturbance and protect the known site micro-climate. All sites would be buffered by a minimum 110 foot radius no-entry buffer. Inside the area to be site prepped and planted this would mean protecting individual maple clumps where known sites are located.

C. ALTERNATIVE 2: NO ACTION

All proposed treatments would be deferred.

D. ALTERNATIVE 3: TRACTOR YARDING SEASONAL RESTRICTION CHANGE

This alternative applies only to Project 1. This alternative is identical to Alternative 1 with the following exceptions.

This alternative would change the seasonal restriction dates for tractor yarding from between August 1 and October 15 to between July 15 and October 15. Approximately 42 percent (101 acres) of the proposed action has been proposed for ground based yarding. In Alternative 1, 2.5 months would be available for ground based yarding. The addition of the time period in this alternative would coincide with the end of the yarding restriction for low sap flow (July 15) and could positively increase the marketability of the timber.

E. ALTERNATIVE 4: DELETION OF TRACTOR SWING YARDING AREA

This alternative applies only to Project 1. This alternative is identical to Alternative 1 with the following exceptions.

This alternative would delete the tractor swing yarding area in unit 19C (Appendix A-2, EA Map). Implementation of this alternative would delete approximately 3 acres of thinning from the harvest area.

F. ALTERNATIVES CONSIDERED BUT ELIMINATED

- Approximately 350 additional acres within Section 17 and 19 were considered for commercial thinning or density management but were deferred as surveys for marbled murrelets in this area could not be completed in time to incorporate into this action.

- Cutting trees in Riparian Reserves for density management, but leaving all cut trees on the site was considered but not recommended by the ID Team for two reasons:

    - Retention of large amounts of dead wood on the ground would immediately increase the risk of fire as well as the rate of spread and resistance to control. The risk of a fire and the rate of its spread would be highest during the first 1 to 2 years following cutting, and would not return to pre-treatment risk levels for 20 to 40 years. The resistance to control, determined by the amount and size of fuels would remain significantly higher than normal for 15 to 25 years. A high loading of surface fuels would increase the

likelihood of fire spreading upward into the canopy and up into snags, further increasing the difficulty of controlling a wildfire. Consequently, desired structural characteristics such as snags and multi-layered canopies would be at a greater risk of loss.

- Douglas-fir bark beetles are attracted to freshly killed Douglas-fir trees over approximately 8-12 inches in diameter. It has been observed that disturbances that produce large numbers of dead trees can cause a population build-up in bark beetles, and result in infestation of adjacent healthy trees. If all cut trees were to remain in the proposed project area, there is a high risk that such an infestation could occur, which could result in killing many of the reserved trees as well as green trees outside the proposed treatment area. Removal of the cut trees would likely greatly reduce this risk.

III. DESCRIPTION OF THE AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES

The following descriptions are the environmental features affected by timber harvest and associated activities and the environmental consequences that would result from implementing the alternatives. This information is summarized in Appendix C-1. If there are no anticipated site-specific impacts, if site-specific impacts are considered negligible, or if the cumulative impacts described in the PRMP/FEIS are considered acceptable, then resource values are not described in this section. A documentation of "no effect" to resources where review is required by statute, regulation, or executive order is included in Appendix C-1, (See *BLM Manual*, Sec. 1790, Appendix 5).

A. GENERAL

The proposed project area is located in T. 14 S., R. 6 W., Sections 17 and 19, in Benton County. The action falls within the Benton Foothills and South Fork Alsea Watershed Analysis Areas (Sixth Field). The land use allocations for the proposed project area are Matrix (GFMA) and Riparian Reserve.

B. TOPOGRAPHY

The project area is located on multiple aspects on slopes generally ranging from 5 to 50 percent. Elevation varies from 900 to 1,600 feet above sea level.

C. VEGETATION

Effects on attaining silvicultural objectives for Matrix lands. Effects on native plant species Effects on Special Status Species or SEIS Special Attention Plant Species. Effects on spread of noxious weed species.

Vegetation: Affected Environment

General and Overstory Vegetation:

The project area is dominated by a Douglas-fir overstory. Several areas tend to have a mixed canopy of Douglas-fir and western hemlock. Big Leaf Maples are scattered throughout much of the project area and red alders are common along aquatic/riparian areas. The understory is often a mixture of vine maple, red huckleberry, California hazelnut and oceanspray. The shrub/forb layer is mostly salal, Oregon grape or sword-fern.

The canopy closure in the project area averages approximately 80 percent. For specifics pertaining to stand data per unit, see silvicultural prescription in EA file.

The project area lies on the west slopes of the crest of the Oregon coast range. The major plant grouping as listed in the Salem District Proposed Resource Management Plan/Final Environmental Impact Statement (V.1, chapter 3, pp.29-32) are the Douglas-fir/Red Alder/Salmonberry grouping which occurs on the west slopes of the Oregon Coastal Mountains and the Douglas-fir/Red Alder/Vine Maple grouping, which occurs on the east slopes of the Oregon Coastal Mountains.

More specifically the area is comprised of the following plant associations:

The western hemlock/Oregon grape plant association is common at upper elevations to upper-slopes with well-drained soils. Soils are either shallow or relatively deep but rocky.
The western hemlock/salal plant association is common on upper slopes and ridges. The soils are moderately deep and well drained.
The western hemlock/Oregon grape/salal plant association is mostly a transition area between the above two associations. Its environment is similar to the western hemlock/Oregon grape association. It occurs at upper slopes with well drained soils. The soils tend to be less rocky than the western hemlock/Oregon grape association and shallower than the western hemlock/Oregon grape/salal association.
The western hemlock/sword-fern plant association is common throughout the forest. It occurs on steep and lower slopes or, less often, on benches and alluvial flats. Soils are well-drained but receive continuous subsurface moisture from upslope. Soils are usually deep and rich in organic matter.
The western hemlock/vine maple/sword-fern plant association is most common on relatively warm, well-drained middle and lower slopes. This association is similar in many respects to the western hemlock/sword-fern association.

The stand age is approximately 60 years old for units 17A, 17B and 19C and approximately 50 years old for units 19A and 19B.

Unit 17A was thinned in 1986 and Douglas-fir dominates the overstory. The unit had little amount of understory or ground cover when it was thinned. Today it has a developed shrub (salal, vine maple, hazelnut & oceanspray) layer with scattered open, moss covered ground areas.

Unit 17B is dominated by a Douglas-fir overstory with scattered big leaf maples. The private lands to the south and east have been clearcut. The understory varies from open to vine maple thickets. The shrub and forb layers are mostly dominated by sword-fern on the slopes and salal on the southern bench area. An opening in Unit 17B (approximately 2 acres) was caused by wind and is adjacent to a clearcut harvest on private land. This area contains a few Douglas-fir, hardwoods and snags. The shrub layer in this area is also dominated by trailing blackberry.

Unit 19A is dominated by a Douglas-fir overstory. It is mostly a southern aspect. The understory is fairly well developed and is dominated by vine maple with lesser amounts of oceanspray and California hazelnut. In areas with a heavy overstory little vegetation is present and is dominated by mosses (*Eurhynchium oreganum*). The shrub/forb layer is mostly salal on upper slopes and ridges and Oregon grape and sword-fern on the lower slopes. Red alder is common adjacent to aquatic systems and roadways.
Unit 19B overstory is mostly dominated by Douglas-fir with lesser amounts of western hemlock. The understory is mostly open with scattered vine maple and occasional red elderberry thickets. The shrub/forb layer is mostly sword-fern and other common forbs. The heavy canopy cover and northern aspect allow for many open moss (*Eurhynchium oreganum*) covered areas. There are scattered red alders along the riparian areas. These areas often have thickets of vine maple and few forbs.

Unit 19C is dominated by a Douglas-fir overstory. A few scattered big leaf maples and red alders are common in the riparian areas. There are also a few clumps of chinquapin on the broad ridge. The understory in this unit is mostly open. There are scattered red huckleberry on the upper slopes and vine maple patches on the lower slopes and in the riparian areas. The shrub/forb layer is mostly salal on the broad ridges and upper slopes. Sword-fern and Oregon grape/salal are common on the lower slopes. The closed canopy and northern slopes have created many open areas without vegetation. These areas are mostly covered in moss (*Eurhynchium oreganum*) with little vegetation.

There are no unique or rare habitats (caves, talus slopes, meadows, wetlands, etc.) present in this project proposal.

The stands are overcrowded with the average relative density ranging from .60 to .83 (see Table 2). The canopy closure averages from 78 percent to 82 percent. The average crown ratio for these stands is 35 percent on dominant and co-dominant trees. Coarse Woody Debris (CWD) per acre over five inches D.B.H. found during the 2001 forest surveys in the thinning areas range from 3,000 cubic feet per acre on unit 19C to 5,000 cubic feet per acre on unit 17A. Coarse Woody Debris in classes 1 and 2 ranges from 0 in 19C to 680 cubic feet in 19A. The majority of the CWD is in decay classes 3, 4 and 5. Based on the 2001 forest surveys, there is a range of 2 to 22 snags per acre depending on the unit.

Other than isolated pockets of *phellinus weirii,* there is no significant disease in these stands.

Special Status and Special Attention Species: Vascular Plants, Lichen, Bryopytes, Fungi:

Vascular Plants:

Inventory of the project area for survey and manage vascular plant species was accomplished in accordance with the survey protocols as described on page 3 of *Survey Protocols for survey and Manage strategy 2 Vascular Plants*, version 2.0, December 1998. Specific surveys for all listed special status and special attention vascular plant species were accomplished on June 17th, July 29th , August 21st , 26th and September 16th, 2002.

There are no "known sites" of any special status or SEIS special attention vascular plant species within the project area nor were any found during subsequent surveys.

Lichens:

Inventory of the project area for survey and manage lichens was accomplished in accordance with the survey protocols as described within the *Survey Protocols for Component 2 Lichens* version 2.0, March 12, 1998. Inventories for newly assigned lichen species into categories "A" and "C" of the *S& M ROD* that currently have no protocols or species included in subsequent annual species reviews were surveyed using the intuitive control method. However, pre-disturbance surveys for these species may not be required for up to two years as described on page 23 of the *S&M ROD*. Specific surveys for all listed special status and special attention lichen species were accomplished on June 17th, July 29th, August 21st, 26th and September 16th, 2002.

There are no "known sites" of any special status or SEIS special attention lichen species within the project area, nor were any found during subsequent surveys.

Bryophytes:

Inventory of the project area for survey and manage bryophytes was accomplished in accordance with the survey protocols as described in *Survey Protocols For Survey and Manage Component 2 Bryophytes*, version 2.0, December 1997 and *Survey Protocols for Protection Buffer Bryophytes,* version 2.0, December 1999. Specific surveys for all listed special status and special attention bryophyte species were accomplished on June 17th , July 29th , August 21st , 26th and September 16th, 2002.

There are no "known sites" of any special status or SEIS special attention bryophyte species within the project area, nor were any found during subsequent surveys.

Fungi:

Inventory of the project area for survey and manage fungi species was accomplished in accordance with the survey protocols as described in *Survey Protocols for (Bridgeoporus nobilissimus) Fungi*, version 2.0, May 1998. Field surveys of the project area indicated that suitable habitat for *B. nobilissimus* does not exist within or adjacent to the proposed project area.

Thus, surveys for fungi are not warranted. However random fungi surveys were conducted on unit 17A in 1997 and 2001.

There are no "known sites" of any special status fungus species within the project area, nor were any found during subsequent surveys.

The following known sites of SEIS special attention fungus species are within the proposed contract area; *Phaeocollybia californica, P. dissiliens, P. sipei and P. spadicea*. All of these known sites were discovered during random Resource Area surveys in the fall of 1997 and 2001.

Noxious Weeds:

The following noxious weeds are known to be within or adjacent to the project area: Tansy ragwort (*Senecio jacobaea*), bull and Canadian thistles (*Cirsium vulgare* and *C. arvense*), St. John's wort (*Hypericum perforatum*) and Scot's broom (*Cytisus scoparius*).

Vegetation: Environmental Consequences

Alternatives 1 (Proposed Action), **Alternative 3** (Tractor Yarding Seasonal Restriction Change) **and Alternative 4** (Deletion of Tractor Swing Yarding Area)

Project 1 (Commercial Thinning and Density Management)

General and Overstory Vegetation:

A growth model (Organon) indicates a thinning would increase individual tree growth in the next five plus years. If thinned, we can expect an increase in the average diameter and quality tree, and fewer trees would die before regeneration harvest of the stand. As shown by the forest growth model summary tables, thinned stands are expected to have average diameter breast height from two to four inches greater than unthinned stands at eighty years of age.

The proposed action would decrease the existing coniferous canopy cover through thinning. The decrease in the canopy cover would allow for an increased amount of sunlight to reach the understory species and forest floor species (shrubs, forbs, ferns and grasses). The increase in sunlight may allow these species to increase in density. Many open slash covered areas could become dominated by shrub and/or fern species. Sunlight would also be increased to the lower parts of the canopy, which may increase the growth rate to the reserved conifers. Eventually we expect that the canopy cover would increase to 80 percent or to approximately just under the levels prior to thinning.

The stems of the conifers would be removed from the site. The tops, branches and broken/shattered stems would remain on site to decay. Some of the broken stems and larger diameter tops would provide habitat for the Douglas-fir bark beetle. In the unlikely event of a large infestation of these beetles, some reserved Douglas-fir trees may be killed in the following 1 to 5 years. Subsequent infestations are not likely after approximately 5 years. If standing trees are

killed it would create snags which are valuable for wildlife. Blown- down timber may also occur post harvest in the thinned areas creating additional coarse down woody debris. Blown-down timber may also lead to an increase in the Douglas-fir bark beetle populations.

All existing vegetation in the forested areas where roads are to be constructed would be scraped to mineral soil and a road constructed. These areas would be heavily compacted through the road building and logging operations. Timber falling and yarding operations would also scrape duff and expose mineral soil in areas, especially yarding corridors. Non-native species may become established in any exposed mineral soil areas. These non-native species often persist for several years but soon decline as native vegetation increases within the thinnned areas.

The proposed action would remove suppressed and some co-dominant trees. This action would open the currently dense canopy allowing more light to reach the forest floor. Trees with 30 percent or greater crown ratio can be expected to respond to a thinning treatment. This would increase ground cover growth, and allow for development of vertical and horizontal structure in the stand while accelerating individual tree growth. Removal of cut trees would reduce favorable conditions for a Douglas-fir bark beetle infestation and provide timber for the economy.

Special Status Species and SEIS Special Attention Species:

The proposed action would not affect any special status or special attention vascular plant, lichen or bryophyte species since none were found or are known to be present within the project area.

The proposed action would not affect any special status fungi species since none were found or are known to be present within the project area.

Special Attention Species (Survey and Manage):

The known sites of all special attention fungi species have all been withdrawn from timber harvest activities and are protected.

All survey and manage species that require protection under the *S&M* ROD would be protected as originally intended in the Salem District RMP. This would provide species outcomes equal to or greater than the prior strategy for the affected species (S&M ROD p.6) covered by the S&M FSEIS at less cost. Protection of S&M species would be in full compliance with the S&M ROD.

Noxious Weeds:

Any ground disturbing activity may lead to an increase in the noxious weeds present in the project area. These species are priority III noxious weeds and are well established and widespread throughout the Mary's Peak Resource Area and the Salem District. Eradication is not practical using any proposed treatment methods. Grass seeding exposed soil areas tends to abate the establishment of noxious weeds. Adverse effects from noxious weeds are not anticipated. The risk rating for the long-term establishment of noxious weed species and consequences of adverse effects on this project area is low.

Project 2 (Bed load trapping and stream gradient reduction)

The felling of approximately 4 trees would not alter the amount of light penetrating the canopy enough to increase ground cover or individual tree growth. The trees would remain on site for the benefit of the aquatic system.

Project 3 (Releasing wolf trees)

Trees grown in more open conditions become more wind firm than those in very dense stands, both because individual trees experience more wind as they develop, which strengthen their bole and because trees with less competition maintain their live crowns longer, giving them a lower center of gravity and decreasing their height/diameter ratios. Some researchers now suggest that wind firmness and individual tree stability greatly affect ability of a tree to reach age 300 and over. Limb diameter on large limby trees would be maintained by releasing those trees to an open grown condition. The long-term results of density management would be larger average DBH, and larger crowns (higher crown ratios) at any given age, compared to a no treatment option. This action would open the currently dense canopy allowing more light to reach the forest floor and subsequently increase ground cover growth. Douglas-fir bark beetle infestations may occur in the felled trees. Some additional standing, healthy or weakened trees within the project area may be killed in subsequent years by beetle infestations. However, it is not anticipated that any widespread infestation would occur.

Project 4 (Fish habitat enhancement)

The felling of approximately 4 scattered trees per 1,000 feet into a fish-bearing stream would not alter the amount of light penetrating the canopy enough to increase ground cover or individual tree growth. The risk of bark beetle infestations would be similar to project 3.

Project 5 (site preparation and conifer planting)

Site preparation and planting of the two acre blowdown area (unit 17B) with conifers would put two acres of Matrix land back into conifer timber production for future forest products.

Alternative 2: No Action

General and Overstory Vegetation:

Nutrients would not be removed from the site. Succession would continue without human intervention. The canopy in this stand would remain closed for several decades. The number and diversity of understory and shrubs/forbs species in many areas may remain low. Blow-down trees may occur from winter storms creating habitat for the Douglas-fir bark beetle, and small infestations may become established in the dying trees.

As openings in the canopy are created additional sunlight would be available to the understory, shrubs and forbs. Additional openings may increase the number and diversity of "botanical and

fungal" species in the area. Open slash covered areas may become dominated by shrubs (salal) and/or ferns.

The predicted “no action” growth for individual trees would be slow compared to Alternative 1. The sparse ground cover and single canopy conditions would remain until the stands begin to self thin as the crown canopy closes over time, creating small diameter CWD in the short term and openings in the canopy. This would increase the light level in the stand, thus increasing ground and shrub growth. The stand would have less vertical structure and poor height to diameter ratio than the managed stand due to the past crowded stand conditions. The residual trees would not be as vigorous as those in the treated stands, with reduced crown sizes. Self thinning would occur more slowly than in the treated stands, resulting in slower attainment and possibly not reaching the desired tree diameter, crown and wood quality for Matrix objectives.

Special Status Species and SEIS Special Attention Species:

Special Status Species:

Not affected, since none were found or are known from the project area.

Special Attention Species (Survey and Manage):

No individual special attention species would be affected since natural succession would continue through these stands.

Noxious Weeds:

Without any new human caused disturbances in the proposed project area the established noxious weed populations would remain low.

D. SOILS

Effects on long-term soil productivity.

Affected Environment

The predominant soil series on and around these sites are: Blachly clay loam (units17-A,19-A, 19-C), Bohannon-Slickrock gravely loam and Preacher clay loam (unit 19-B).

Blachly soils are deep, well drained, gently to moderately sloping soils that developed from alluvial and colluvial materials derived from arkosic sandstone. The surface soils are a dark-brown clay about 9 inches thick with a layer of decomposed and fresh plant litter on the surface. The sub-surface soil is over 80 inches thick and is dark-red and dark reddish-brown clay. Strongly weathered and fractured rock is at a depth of approximately 90 inches.

Bohannon-Slickrock soils are moderately deep, well-drained soils that formed in colluvium weathered from sandstone. They are found on Coast Range sites at elevations from 1,000 to 3,500 feet. Slopes range from 25 to 75 percent. Typically, the surface soil is a very dark-brown and dark brown gravelly loam about 18 inches thick. The sub-soil is a dark brown gravelly loam about 17 inches thick. It is underlain by sandstone bedrock at a depth of about 35 inches.

Preacher clay loam soils are deep, well drained, gently to steeply sloping soils that developed from alluvial and colluvial materials derived from sandstone. The surface soils are a very dark-brown and dark-brown clay about 14 inches thick. The sub-soil is a dark yellowish-brown clay loam about 28 inches thick. Pebbles make up about 10 percent of this layer. The underlying material is yellowish-brown clay about 18 inches thick. Weathered sandstone is at a depth of approximately 60 inches.

Undisturbed Preacher and Slickrock soils have a moderate permeability and infiltration rate. The erosion hazard (for bare soil) is moderate. Undisturbed Bohannon soil has a moderately rapid permeability and high infiltration rate. Undisturbed Blachly soil has a moderately slow permeability and low infiltration rate. The erosion hazard (for bare soil) for both Bohannon and Blachly soils is moderate to high. Water holding capacity for Preacher and Slickrock soils is 6 to 12 inches. Effective rooting depth is 40 to 72 inches. Water holding capacity for Blachly soil is 7 to 9 inches. Effective rooting depth is 90 or more inches. Water holding capacity for Bohannon soil is 3 to 4 inches. Effective rooting depth is 20 to 40 inches.

Preacher clay loam soils are deep, well-drained, gently to steeply sloping soils that developed from alluvial and colluvial materials derived from sandstone. The surface soils are a very dark-brown and dark-brown clay about 14 inches thick. The sub-soil is a dark yellowish-brown clay loam about 28 inches thick. Pebbles make up about 10 percent of this layer. The underlying material is yellowish-brown clay about 18 inches thick. Weathered sandstone is at a depth of approximately 60 inches.

Undisturbed Preacher and Slickrock soils have a moderate permeability and infiltration rate. The erosion hazard (for bare soil) is moderate. Undisturbed Bohannon soil has a moderately rapid permeability and high infiltration rate. Undisturbed Blachly soil has a moderately slow permeability and low infiltration rate. The erosion hazard (for bare soil) for both Bohannon and Blachly soils is moderate to high. Water holding capacity for Preacher and Slickrock soils is 6 to 12 inches. Effective rooting depth is 40 to 72 inches. Water holding capacity for Blachly soil is 7 to 9 inches. Effective rooting depth is 90 or more inches. Water holding capacity for Bohannon soil is 3 to 4 inches. Effective rooting depth is 20 to 40 inches.

Due to the substantial amount of clay and silt size particles in these soils, they easily compact when moist or wet and subjected to pressure from heavy equipment, dragging logs etc. Once compacted, fine textured soils are very slow to recover as is evidenced by the existing compaction on site. Compaction of the soil can reduce site productivity by limiting or restricting root growth in the compacted soil as well as limiting movement of O_2 , CO_2 and H_2O into, out of and within the soil. Depending on the extent and degree of compaction, some reduction of site productivity can be expected. In addition to reduced site productivity on compacted sloping sites, a reduced water infiltration rate can result in higher rates of surface water accumulation and run off. On

bare soil the hazard of erosion can be high. Minimizing compaction of soils in the project area and maintaining vegetation and litter on the soil surface should be a high priority, especially on the steeper areas or long continuous slopes. Most of the under story and surface vegetation and litter would remain on the proposed project site. Any tractor skid roads compacted and made bare from the logging operation would pose the greatest risk for water runoff and soil erosion. Mitigation measures following yarding can minimize this potential problem. The major soils concern for this project is the potential reduction of site productivity due to compaction.

Environmental Consequences

Alternative 1 (Proposed Action)

Project 1 (Commercial Thinning and Density Management)

Roads:

Constructing 3,200 feet of new road would result in loss of top soil and compaction of soil on approximately 1.2 acres of forested land and convert it to a non-forest road condition, (about 0.5 percent of the total project area).

New impacts to soils from renovating roads would be minimal since these areas were developed in the past and the displaced top soils and compacted soils already exist.

Upon completion of the project, the newly constructed roads would be closed and "winterized". Water bars, out sloping, seeding and blocking access are all measures that would result in reduced surface erosion and runoff. The rock surfacing would still remain.

Logging:

Impacts would vary depending on how much of the total project area is skyline yarded verses ground-based yarded.

For the ground base yarded area, impacts would depend on whether a harvester / forwarder system or crawler tractors are used, how dry the soils are when heavy equipment operates on them and how deep the soils are covered with slash in the yarding roads during logging operations. Impacts also include the additional forest area used for landings. For many of the landings, a portion of the existing haul road or the harvest road is used for equipment to operate on, thus reducing the total amount of additional ground impacted by landings. Some additional ground adjacent to the road surface is used to turn equipment around on and to deck logs until transport. The degree of soil disturbance and compaction in areas where logs are sorted or decked is expected to be low. Areas where equipment turns around repeatedly would experience heavy disturbance of the top layer of soil and moderate to deep compaction of surface and sub-surface soil.

For cable yarded areas, soil impacted by skyline yarding roads, (about 3 percent of the skyline area) usually results in light compaction in a narrow strip less than 4 feet in width. This is especially true for this type of project where logs are relatively small and there would be adequate

slash on the ground in the corridors to yard over. Affect on site productivity from this type of disturbance is minimal to none.

Compaction and disturbance/displacement of soil:

Harvester/Forwarder

If a harvester / forwarder system is used for the entire ground-based portion (18 acres) of Unit 19A, the area impacted by surface disturbance and soil compaction is estimated to be: approximately 1acre from landing construction and approximately 0.75 acres from harvester / forwarder yarding roads. Total percent of ground base yarding area affected: approximately 10 percent (less than 2 ac.). As a percentage of the entire 80 acre unit 19A, affected acreage is less than 2.5 percent. Very little or no top soil loss should occur, except at landings where some soil displacement would occur. Compaction is expected to be light to moderate except at landings where compaction would be moderate to deep.

Crawler/Tractor

If yarding is done using crawler tractors for the entire ground-based area in Unit 19A, the area impacted by surface disturbance and soil compaction as a result of landing construction would be approximately 1ac.; from tractor yarding roads approximately 1.25 ac. Total percent of ground base area affected: approximately 12 percent (2.25 acres.). As a percentage of the entire 80 acre unit 19A, affected acreage is less than 3 percent.

The proposal for unit 17A, (83 acres) is to tractor yard the entire unit utilizing many of the existing skid roads. The area impacted by surface disturbance and soil compaction as a result of landing construction would be approximately 4 acres, from tractor yarding roads approximately 6 acres. Total percent of ground base area affected: approximately 12 percent (10 acres.). In Unit 17A approximately 80 percent of these impacts (existing tractor skid roads) already exist from the previous thinning. Impacts resulting from this operation would primarily be removal of vegetation from existing skid trails. Some further degree of soil compaction in the skid trails may occur depending on how wet the soils are when yarding occurs. Since most of the necessary skid roads already exist, the acreage of new or additional harvest impacts resulting from the tractor logging would be less than the total cumulative acres of impacted ground listed above.

For the tractor swing yarding area in unit 19C, one tractor yarding road not to exceed 600 feet in length would result in surface disturbance and soil compaction on less than 0.1 ac. As a percentage of the entire 44 acre unit, affected acreage is approximately 0.2 percent. If the swing road is water barred and debris placed on the surface following yarding there would be insufficient accumulation of surface runoff to cause erosion. Effects from soil compaction on site productivity would be similar to that for the other tractor yarded areas.

For tractor yarding areas expect a moderate amount of top soil loss (displacement) to occur in yarding roads and higher amounts of displacement at landings. Compared with harvester/forwarder or cable logging, compaction from tractor logging would tend to be moderate to severe (deeper and more tightly packed) and be more continuous in aerial extent. The degree

and extent of compaction effects are dependant on the level of soil moisture, amount of top soil, litter and slash, and number of passes.

The severity of compaction can be mitigated somewhat when slash and small logs are left in the skid roads and the total number of passes is low (less than 6). With tractor skidding it is much harder to keep slash and debris on the skid roads for more than a few passes, so additional effort would be needed to replace slash and debris back onto skid roads. Operating only when soils are dry and soil strength is high would help to reduce the amount of crushing of individual soil aggregates and resulting compaction. Multiple passes on moist or wet soil usually results in rutting and heavy, deeper compaction.

For the entire project area, the cumulative acreage of soil disturbance from past and present activities (new and existing roads and logging) is estimated to be:

4 acres of roads (for roads along unit boundaries ½ of the area is counted)
4 acres of light compaction from cable logging
12 acres of moderate to deep compaction from ground based logging
20 acres or 8.4 percent of the project area.

In the worst case, following completion of the project, the area would have about 8.4 percent of total acreage with some level of unmitigated soil compaction / disturbance. The Salem District RMP lists 10 percent as the maximum acceptable level of aerial extent for soil disturbance/compaction.

The risk of surface erosion is expected to be minimal for most of the area.

Site Productivity:

The effect on overall site productivity from 4 acres of light compaction from cable logging is less than 0.2 percent reduction in yield. The effect on overall site productivity from 4 acres removed (by new road construction) from the growing base is approximately 1.7 percent reduction in yield. The affect on overall site productivity from 12 acres of moderate to deep compaction from ground based logging is approximately 1.0 percent reduction in yield. Total worst case reduction in yield for this proposed action would be approximately 2.9 percent.

Some of the potentially impacted acreage listed above, includes already existing, compacted skid roads from previous logging in the 1940's and 1980's. These existing roads would be used as much as practical when designating locations for harvest roads for this project. As a result, the amount (acreage) of new or additional harvest impacts would be less than the totals listed above, while the total area of impacted ground is to be within the total ranges listed.

In order to avoid damage to existing tree roots, we would not rip skid roads to mitigate compaction. Mitigation would only be in the form of minimizing soil disturbance and compaction by yarding on top of slash as much as possible and doing ground based yarding during periods of low soil moisture with a minimum number of yarding roads.

Project 2 (Bed load trapping and stream gradient reduction)

The risk of surface erosion due to the felling of approximately 4 trees into Peak Creek is expected to be minimal. The trees would remain in place where they fell minimizing soil disturbance.

Project 3 (Releasing wolf trees)

The risk of surface erosion due to the felling of trees adjacent to existing large limby trees is expected to be minimal. The trees would remain in place where they fell minimizing soil disturbance.

Project 4 (Fish habitat enhancement)

It is unlikely that the proposed felling of 4 trees per 1,000 linear feet into a fish bearing stream would increase the risk for surface erosion. Minor quantities of soil may enter the stream primarily where the trees are felled into or immediately adjacent to the stream. Compaction of the surface soil from the felling of the trees would be negligible since the trees would remain in place where they are felled.

Project 5 (Site preparation and conifer planting)

The removal of soil from 1 foot radius planting spots within a 2 acre area would result in minor quantities of soil displacement and/or compaction.

Alternative 2 (No Action)

No change in soil conditions from what exist on the site at the present time.

Alternative 3 (Tractor Yarding Seasonal Restriction Change)

The impacts for this alternative would be the same as for Alternative 1 except that there would be a higher likelihood of creating an increase in the aerial extent of deeper compaction in the tractor yarding areas since the earlier start-up date generally would equate to wetter soil conditions. Deep compaction is a very long-lived impact, lasting many decades. Soil impacts with this change would still be within RMP guidelines.

Alternative 4 (Deletion of Tractor Swing Yarding Area)

There would be a reduction of 0.1 acres of moderate to deep compacted soil in unit 19C. The change in site productivity would be statistically insignificant.

E. FUELS/AIR QUALITY

Effects on fuel loading and fire risk and air quality.

Affected Environment

The project area is presently occupied by fairly continuous stands of second growth Douglas fir timber with varying minor components of western hemlock, western red cedar, bigleaf maple and red alder trees. Due to the commercial thinning in 1985 unit 17A is a fairly uniform, more open stand of Douglas fir. Stand ages average about 55 years of age. Undergrowth is a moderate growth of salal, Oregon grape, vine maple, ocean spray and huckleberry. There is a light to moderate accumulation of dead woody material on the ground. Small snags are scattered through the stand. Large snags (over 20" dia.) are few in number, small snags in the 4"- 10" size are common. Based on visual estimates, using GTR-PNW-105, series 1-DFHD-3 and 2-DFHD-3, the estimated total dead fuel loading for these stands is in the 5-15 tons per acre range. Fuel model for these sites would be model 8-closed timber litter.

Environmental Consequences

Alternative 1 (Proposed Action)**, Alternative 3 (**Tractor Yarding Seasonal Restriction Change**)** and **Alternative 4 (**Deletion of Tractor Swing Yarding Area)

Project 1 (Commercial Thinning and Density Management)

Fuel loading and fire risk would increase at this site as a result of the proposed action. Vegetation cleared for road construction would result in creation of approximately 45 tons of slash that would be scattered along the right-of-ways. Most of this material would end up being piled and burned following harvest operations and some would remain scattered in and adjacent to the right of way. This would increase risk for a fire start along the ROW while the roads are in use. Following project completion, burning of the piles and road closure, the increase in fire risk would be minimal.

New impacts to fuels from renovating roads would be minimal since these areas have already been developed in the past and the amount of vegetation to be cleared and scattered along the right of ways would be minimal. Any large accumulations of slash would be burned along with the other landings and piles.

Piling and burning slash accumulations along the roads and blocking vehicle access to some roads into this area would reduce the risk of human-caused fire starts. It must be noted however, that blocking vehicle access has the negative effect of also reducing access by fire vehicles and personnel in the event of a fire. In this area of Oregon, however, most fires are human caused, so restricting entry should result in lower overall risk of loss by fire.

The increase in overall slash within the units, created by the proposed thinning would result in a higher risk of fire on the thinned sites following logging. The dead fuel loading is expected to be

increased by 5 to 15 tons per acre with a discontinuous arrangement. Total dead fuel loadings would range from approximately 15 to 35 tons per acre. The fuel model would shift from Model 8 to model 10/11. Overall, the risk of fire following this action would be low to moderate. This is due to the moderate topography, the continued existence of a tree canopy shading the fuels, and the fact that access roads to some of the treated area would be blocked.

Risk of fire would be greatest during the period when attached needles dry out the first season following cutting. These “red needles” generally fall off within one year and fire risk greatly diminishes. Fire risk would continue to diminish as the area "greens up" with under story vegetation, and the fine twigs and branches in the slash begin to break down. In order to mitigate fire risk, these sites should be monitored for the need of closing or restricting access during periods of high fire danger. Burning landing piles and slash concentrations along roads would reduce risk of a fire start from human ignition sources.

Burning would be done in the fall under good atmospheric mixing conditions when the threat of impacting air quality in designated areas would be very low. Any residual smoke should be of short duration and occur during a period of the year when there is less outdoor activity, generally good mixing and an increasing likelihood of rainstorms that would scour the air shed and extinguish residual fire.

Project 2 (Bed load trapping and stream gradient reduction), Project 3 (Releasing wolf trees) Project 4 (Fish habitat enhancement) and Project 5 (Site preparation and planting of conifers)

The proposed projects could slightly increase fuel loading and risk of fire spread and intensity after trees are on the ground and brush is cut within site prep area. The creation of dead fuels from the tree crowns would pose a minor increase in risk but this is expected to diminish within a few years. Most of the project activity would occur in isolated areas away from roads or trails or other points of human activity. Where trees are felled near access points, fuels would be assessed for fire risk and mitigated by removal or scattering if increased risk indicates a need to mitigate.

Alternative 2 (No Action)

Short-term conditions would remain as they are at present. Risk of catastrophic consequences due to wildfire may increase. Densely stocked stands with consequent large numbers of small snags and CWD burn more readily and are more subject to crown fires than stands growing at lower densities. It is possible that over time, as the volume of small dead wood on the ground increases and the contact between live crowns increases, the resistance of fire control may increase.

F. WATER

Effects on stream flow, channel conditions, and water quality. Effects on the attainment of Aquatic Conservation Strategy objectives.

Affected Environment

Project Area Climate and Hydrology:

The project area lies in two 5th field watersheds: the Upper Alsea River and the Marys River. There are two stream systems draining the project area: tributaries to Peak Creek, which flows into the South Fork Alsea in the Upper Alsea River 5th field watershed (HUC# 1710020501) and tributaries to Oliver Creek, which flows into Muddy Creek in the Marys River 5th field watershed (HUC# 1709000303).

The project area receives approximately 85 inches of rain annually and has a mean 2-year precipitation event of 4.5 inches in a 24-hour period (N.O.A.A. Precipitation-Frequency Atlas for Oregon, Volume X). Most runoff is associated with winter storm events that result from low pressure fronts moving inland from the southwest off the Pacific Ocean. Peak stream flow events are concentrated in the months of November through March when Pacific storm fronts are strongest. As a result of little or no snow pack accumulation and infrequent rainfall, stream flow in the summer is typically a fraction of winter levels and many headwater channels retreat to subsurface flow. At a distance of over 25 miles from the ocean, fog and fog drip are not significant contributors to watershed hydrology in the project area.

While snow pack accumulation in the Oregon Coast Range is unusual, elevations between 1,500 feet to 3,000 feet are in a "transient snow zone". In most years, at elevations above 1,500 feet, snow remains for short periods and may be subject to rain on snow events (ROS) (U.S.D.I. 1995). ROS events have the potential to increase peak flows during winter or spring storms and may lead to flooding.

Streams in the project area drain Green Peak and nearby ridges of moderate slope. Project area soils have good to moderate permeability with low risk of mass wasting events. There have been few debris slides in the Upper Alsea and Marys River watersheds due to well-drained soils and relatively moderate terrain. The potential landslide risk in the project area is low and medium (for the northwest area of section 19). However, historical clearcut and road-related landslides have increased the rate of sedimentation in these stream channels (U.S.D.I. 1997).

Project Area Stream Channels:

Small tributary channels, mostly with ephemeral or intermittent flow regime, predominate in the project area. These are Rosgen type "A" channels: more than 10 percent gradient and entrenched with low width/depth ratio and low sinuosity. Reflecting their colluvial nature (dominated by hill-slope geomorphic processes) channel substrates are predominately in the small gravel to sand size classes. All channels of these types viewed in the project area are vegetatively stabilized (i.e. the

vegetation in channel and on the banks is the predominate stabilizing element) and currently in proper functioning condition (U.S.D.I. 1998). None of the channels in the project area are currently functioning at risk or nonfunctional; nor exhibit indications of instability (i.e. high rates of bank erosion and sediment transport, Anick points, etc).

Peak Creek, the main perennial channel which drains the project area (section 19), is primarily a Rosgen type "B4" channel: 2-4 percent gradient, moderately entrenched, low width/depth ratio, and low sinuosity. Reflecting its colluvial nature, channel substrates are predominantly in the small gravel to sand size classes. This channel was viewed in the field and is vegetatively stabilized. The reach of the first order Peak Creek tributary flowing through the project area most closely resembles a Rosgen AC4" stream, a slightly entrenched, meandering, gravel-dominated, riffle/pool channel with a well-developed floodplain (Rosgen 1998). The channel is dominated by beaver dams and beaver activity, which has resulted in some flooding and wetland conditions. Further upstream the channel is unstable, braided and entrenched with a very high sediment supply. Peak Creek has been noted for its high input of sediment into the South Fork Alsea River (U.S.D.I. 1995).

Project Area Water Quality and Beneficial Uses:

Fine Sediment and Turbidity

Occasional turbidity grab samples have been collected since 1995 during winter storm events in the Peak Creek and Muddy Creek sub-watersheds. Lower Peak Creek nephlometric turbidity units (NTU) levels ranged from a low of 1.5 to a high of 54 with a median value of 7.0. A reading of 66 NTUs on Upper Peak Creek was collected below a blown-out beaver dam during the 1996 flood. However, this level of turbidity was short-lived and does not represent normal winter conditions. Oliver Creek NTU levels ranged from a low of 8.0 to a high of 55 with a median value of 12. These median NTU values are below the maximum NTU levels found on one study of Mill Creek in the Alsea River basin (Bescheta 1979) and the median values of 7 and 12 NTUs are well below the 30 NTU standard Oregon DEQ set for the Umatilla sub-basin Total Maximum Daily Load assessment (ODEQ 1999).

Turbidity samples were also collected on upper Oliver Creek, above and below the culvert at Rd. 13-6-29, north of the project area, during a rainstorm on 11/29/00. For this storm event, with approximately 1 inch of precipitation in a 24-hour period, there was no measurable difference in the mean NTU levels of the stream above and below the road. The ranges and means of these samples were 2.6-20.2 with a mean of 11.6, and 3.8-36.7 with a mean of 12.1 NTUs above and below the culvert respectively. An unpaired T-test indicated that the difference between the means of the two groups was not statistically significant at the 95 percent confidence level.

During field review of stream channels in the project area, channels were observed to be stable and functional with sediment supplies in the range expected for these stream types. Furthermore, turbidity data indicates that fine sediment supply and transport are within the range of natural variability in these watersheds. However, sampling to date has been infrequent. Currently there is not enough sediment data in these watersheds to provide a detailed representation of water quality

conditions. In response to these concerns, physical and biological monitoring in these watersheds is ongoing.

Stream Temperature

No stream temperature data for Oliver Creek was located for this analysis. Stream temperatures in lower Peak Creek exceeded the State of Oregon=s standard of 17.8E C in the summer of 1995 and 1996. Temperatures at the two sites tested were below the threshold in 1997. No additional stream temperature data was located for this analysis.

Five out of 14 headwater tributaries in or near the project area do not flow on the surface during most summers. Therefore, these channels are not at risk to heating by exposure to direct solar radiation. The remaining 8 tributaries (with the exclusion of the Peak Creek main tributary) have very low to intermittent flow. Most of these channels are sufficiently shaded by streamside vegetation to meet summer temperature standards. Numerous studies have documented stream temperatures in shaded upland streams that are consistently below Oregon's water quality standard of 17.8° C. One of these studies (Streamflow, Sediment-Transport, Water-Temperature Characteristics of Three Small Watersheds in the Alsea River Basin, Oregon. USGS Survey Circular #642, 1971) showed temperatures in three shaded upland channels in the Oregon Coast ranging from 16.6-1° C. However, a recent clear-cut along the western boundary of Unit 17A has increased solar radiation exposure of the western tributary along the unit, with the potential to elevate summer temperatures.

Based on field observations, the headwaters of Peak Creek in the project area are sufficiently shaded by canopy cover and streamside vegetation to meet the Oregon state standard for summer temperatures. The main Peak Creek tributary in the project area flows through an open valley meadow, with little to no canopy cover. Based on field and aerial photo observations and past monitoring records, Peak Creek has the potential to be heated to temperatures above state standards by exposure to direct solar radiation.

Other Water Quality Parameters

Additional water quality parameters (e.g. nutrients, dissolved oxygen, pesticide and herbicide residues, etc.) are unlikely to be affected by this proposal and were not reviewed for this analysis (US E.P.A. 1991).

Oregon Department of Environmental Quality (DEQ) Listing

The Oregon Department of Environmental Quality=s (DEQ) 1998 303d List of Water Quality Limited Streams (http://waterquality.deq.state.or/wq/303dlist/303dpage.htm) is a compilation of streams which do not meet the state=s water quality standards. A review of the listed streams for the Alsea sub-basin and the Upper Willamette River sub-basin was completed for this report. Neither the South Fork Alsea nor Marys River and their tributaries are listed on the 1998 303d report.

The DEQ published an assessment, the 319 Report, which identifies streams with potential non-point water pollution problems (1988 Oregon Statewide Assessment of Nonpoint Sources of

Water Pollution). No water quality issues were identified for Peak Creek, Oliver Creek, nor Muddy Creek. The Lower South Fork Alsea was identified as having moderate water quality problems affecting general water quality, fish and aquatic habitat. However, no description of the problem or data in support was located in the report. Other sources of information (watershed analysis, ODFW habitat surveys) give more up to date information, supported by data, on fish and aquatic habitat conditions for these streams (see the Fisheries report in this assessment).

Beneficial Uses

Beneficial uses of surface water from the project area are displayed in Table I. There are no known municipal or domestic water users in the project area. There are no water rights listed for Peak Creek. There are irrigation rights and one manufacturing right along Oliver Creek, approximately 2 miles downstream from the project area near Dawson. Irrigation and livestock watering occur in the Alsea valley and in the Muddy Creek valley, several miles downstream from the project area. Additional recognized beneficial uses of the stream-flow in the project area include anadromous fish, resident fish, recreation, and esthetic value. BMP's would be implemented to eliminate or minimize any potential affects to beneficial uses in the watersheds.

Table 1. Beneficial Uses Associated with Streams in the Project Area

Streams (Sub-watershed-6th field)	Proposed Activity	Beneficial Use of Water	Approximate Distance from Project	Information Source
Peak Creek (South Fork Alsea)	Stand density management Road construction/ renovation Project 2 (Bed load trapping and stream gradient reduction) Project 3 (Releasing wolf trees) Project 4 (Fish habitat enhancement)	Anadromous fish	1.75 miles (below Green Peak Falls)	BLM. 1995
		Resident fish	Within project area	BLM. 1995
		Domestic use	Greater than 10 miles	WRIS[1]
		Irrigation/live stock watering	Greater than 10 miles	WRIS
Oliver Creek (Muddy Creek)	Stand density management Road construction/ renovation Project 5 (site preparation and conifer planting)	Anadromous fish	Greater than 10 miles	BLM. 1997
		Resident fish	Immediately below project area	BLM. 1997
		Domestic use	Greater than 10 miles	WRIS
		Irrigation/ livestock watering	2 miles	WRIS

1. WRIS = *Water Rights Information System* on the Oregon Department of Water Resources website.

Water: Environmental Consequences

Alternative 1 (Proposed Action) and **Alternative 3** (Tractor Yarding Seasonal Restriction Change)

Project 1 (Commercial Thinning and Density Management)

Direct and Indirect Effects

Measurable effects to watershed hydrology, channel morphology, and water quality as a result of the proposed action are unlikely. This action is unlikely to alter the current condition of the aquatic system either by affecting its physical integrity, water quality, sediment regime, or in-stream flows.

This proposal is unlikely to substantially alter stream flow or peak flow events. Tree removal and road renovation and construction would not occur on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action. In addition, potential impacts resulting from tree harvest and road construction/renovation would be mitigated to reduce the potential for measurable sediment delivery to streams, by implementing Best Management Practices (BMPs), which include but are not limited to: stream and road buffers, minimum road widths, minimal excavation, ensuring appropriate drainage from road sites (such as installing frequent cross drains & vegetated ditch lines) and appropriate harvest techniques. Although thinned, substantial portions of the riparian canopy would be retained, therefore maintaining riparian microclimate conditions and protecting streams from increases in water temperature.

In conclusion, this proposal is unlikely to impede and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy (ACS). Over the long term, this proposal should aid in meeting ACS objectives by speeding the development of older forest characteristics in the riparian zone, which in turn increases streamside shading and the potential for large woody debris contributions into stream channels.

<u>Streamflow:</u>

Alterations in the capture, infiltration and routing (both surface and subsurface) of precipitation as a consequence of the mechanical removal of trees and reduction in stand density, has been documented on watersheds in the Pacific Northwest and other parts of the world. An extensive study by Bosch and Hewlett (1982) concluded that reductions in forest cover if less than 20 percent cannot be detected by traditional measurements of streamflow. The proposed actions would affect less than 1 percent of the forest cover in the two watersheds [Project area includes 0.02 percent of forest cover in Marys River 5th-field and 0.3 percent of forest cover in the Upper Alsea 5th-field]. Therefore, detectable direct or indirect effects to streamflow as a result of this action are unlikely.

This action was analyzed for its potential contribution to cumulative effects to streamflow in the Peak Creek and Oliver Creek 6th-field sub-watersheds (see Cumulative Effects in this document).

Stream Protection Zones

For the protection of stream channels and aquatic resources, riparian buffers or stream protection zones were applied to all stream channels in the project area. These zones were determined in the field by BLM personnel following a protocol developed by the area hydrologist, biologists, and riparian ecologist. Stream buffers extend at least 50 feet from stream channels. This zone would be extended upslope during field surveys as far as deemed necessary to protect aquatic resources. This determination was based on site features such as floodplains, slope breaks, slope stability, water tables, etc. Additionally, no treatments in the riparian areas are proposed unless stand densities and composition clearly indicate the need. Hence, large areas of riparian vegetation were excluded from treatment under this proposal.

Road Construction and Hauling

All the proposed road construction and reconstruction locations have been reviewed in the field for potential effects to water quality. Approximately .6 miles of new road would be constructed. All construction is limited to moderate to low gradient sites (less than 10 percent) and all permanent construction within Riparian Reserves would be closed and winterized. All new road construction and renovation would occur at least 210 feet from stream heads (Stream Initiation Points - SIPs), with the exception of one road new construction along the northern project boundary in section 19. The road would run approximately 100 feet from and perpendicular to the SIP of a perennial, confined, colluvium-dominated tributary to Peak Creek. The road construction is unlikely to impact the channel morphology and/or water quality of this stream for the following reasons: 1) the road construction would follow a very low gradient (gradient between the road site to the SIP is variable around 12 percent), 2) best management practices would be implemented to minimize impacts to soils, vegetation, and water quality, during and following reconstruction (as described above and below), and 3) adequate forest ground cover exists to dissipate any potential increases in runoff and to trap/filter sediments before they can reach the SIP.

The risks of impacts to water quality due to road construction would be limited by restricting work to periods of low rainfall and runoff. Construction would employ techniques to reduce concentration of runoff and sediment to a minimum, such as minimizing construction, installing cross-drains, and building berms and water-bars on steeper sections of road to prevent runoff channelization.

The main haul routes would follow the rocked forest roads for several miles to a paved well-established main route. All new construction would be rocked and outsloped (with the exception of the skid road). All new construction would be closed and "winterized" upon project completion, which includes but is not limited to water barring and grass seeding of cut and fill slopes. Timber hauling during periods when water is flowing on roads and into ditches could potentially increase stream turbidity if flows from ditches were large enough to enter streams. The contract administrator would monitor conditions and take steps to mitigate hauling related sediment entry into streams.

Tree Harvest and Yarding

Yarding corridors, if sufficiently compacted, may route surface water and sediment into streams. Several factors could limit the potential for this to occur: 1) even if compacted, high levels of residual slash on yarding corridors (both machine and cable), would reduce runoff by deflecting and redistributing overland flow laterally to areas where it would infiltrate into the soil, 2) no-treatment zones in riparian areas have high surface roughness which functions to trap any overland flow and sediment before reaching streams, 3) the small size of trees being yarded would limit surface disturbance to minimal levels, and 4) tractor yarding would occur during periods of low soil moisture with little or no rainfall.

Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to streams is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action.

Tractor Swing Yarding

This proposal would include a tractor swing yarding area in unit 19C. A skid road is proposed within the Riparian Reserve, not to exceed 600 feet total length. The road would be constructed along a narrow strip within 75 feet of adjacent streams. Adjacent streams would be buffered at a minimum of 50 feet. The road would be minimally excavated and used by a crawler tractor to yard logs to a point where they can be feasibly skyline yarded. The ground disturbance caused by construction and repeated crawler trips up and down the skid road, if sufficiently compacted, may route surface water and sediment into adjacent streams. However, several mitigating practices limit the potential for sedimentation to occur and the effects of the action on water quality or stream morphology are likely to be immeasurable. Following harvest, the road prism would be filled with heavy slash/debris and water-barred at approximately 50 feet spacing (closer for steeper terrain). If necessary, additional best management practices as described above and below would be implemented during and following its use.

The cumulative effects analysis for risk of increases to peak flows would not be significantly different under alternative 3.

Site Preparation

No post treatment site preparations, such as under-burning or soil scarification, are proposed. Pile burning along roads may produce small patches of soil with altered surface properties that restrict infiltration. However, these surfaces are surrounded by large areas that would easily absorb any runoff or sediment that may reach them. Pile burning would occur away from surface water or streams.

Stream Temperature

Project 1 is unlikely to have any measurable effect on stream temperatures in project area watersheds. Forest stand density and hence, shading within stream buffers and adjacent to Peak Creek would be left virtually unaltered under this proposal. Shading along other tributaries in the project area is currently adequate.

Channel Stability and Function

In the short term, Project 1 is unlikely to alter the current conditions of channels in the project area for several reasons: 1) there would be no activities directly in channels, or on streambanks or flood plains, 2) stream flow and sediment delivery are unlikely to be altered due to mitigation measures to filter and redirect any potential runoff, and 3) the supply of large wood in the channel and floodplain would not be altered.

Field review of channels in the project area found that they are functioning within the range expected for these stream types in the Oregon Coast Range. The minimization of potential disturbances from the proposed project is likely to result in maintenance of project area stream channels in their current condition (i.e., functional).

Over the long term, reductions in stand density would likely increase riparian forest health and tree size. This would lead to increased large wood recruitment for stream channels, an important factor in proper channel function. Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bed load, and improve aquatic habitat.

Project 2 (Bed load trapping and stream gradient reduction) Project 4 (Fish habitat enhancement)

The direct, indirect, and cumulative effects to project area hydrology would be similar to Project 1 with the exception of effects to the stream channel condition of Peak Creek. The action would entail felling approximately 4 trees into Peak Creek in order to create a jam below a culvert at the junction of 14-6-17 and 14-6-19 roads in order to facilitate fish passage.

In the short term, this action may immediately increase sedimentation and flow turbidity. Over the long term, the action would likely slow stream velocities, increasing sedimentation and raising the channel bed level.

Peak Creek's channel currently has a high sediment load, in part due to beaver dams and reaches of low gradient (low energy flow). However, the channel reach of Peak Creek which passes through the project area is currently lacking in large wood and is entrenching. The addition of large wood into the channel may help to stabilize the channel banks by encouraging substrate attrition and restoring channel function.

Project 3 (Releasing wolf trees)

Direct and indirect effects to water quality, hydrological function and stream channel condition would not be measurably different from the Project 1 (Commercial thinning and Density Management). Thinning in the riparian zone carries little risk to water quality or channel function and provides potential benefits. Over the long term, reductions in stand density would likely increase riparian forest health and tree size. This would lead to increased large wood recruitment for stream channels, an important factor in proper channel function. In addition, more open stands would allow for the growth of important riparian species in the under-story. The cumulative effects analysis for risk of increases to peak flows would not be significantly different under this project.

Project 4 (Fish habitat enhancement)

The direct and indirect effects to water quality, hydrological function and stream channel conditions would be near identical to those for the proposed alternative with the exception of short-term channel condition in the effected streams. Field Review of this proposal determined that the risks to downstream resources, water quality, and channel stability were low as potential channels to receive LWD are currently in functioning condition. In the short term, the addition of large wood may produce some increased turbidity and sedimentation. Over the long term, increased wood can improve channel function and aquatic habitat by slowing stream velocities, retaining sediments (above structures), creating pools (below structures), and retaining organic material. The cumulative effects analysis for risk of increases to peak flows would not be significantly different under this alternative.

Project 5 (Site preparation and conifer planting)

Site preparation and conifer planting are not likely to result in measurably direct or indirect effects to water quality, hydrological function and stream channel condition. Some local erosion may result from scalping circles around planting spots and during tree planting. However, the amount of sediment transport would be minimal and unlikely to reach streams. Areas around planting circles would remain vegetated and covered by forest duff, which would trap any loosened soil. In addition, site preparation and conifer planting would occur away from streams (outside of stream buffers).

Cumulative Effects

Stream flow

In almost all cases, removal of more than 20 percent of the vegetative cover over an entire watershed would result in increases in mean annual water yield. Removal of less than 20 percent of vegetative cover has resulted in negligible changes where it was not possible to detect any effect (i.e. the error in measurements was greater than the change) (Bosch 1982). Typically increases in stream flow occur during periods of low soil moisture and are attributed to reductions in evapotranspiration by nearby vegetation.

In addition, alterations in the timing and/or quantity of peak flow events as a result of forest harvest and road construction have been studied for several decades. Jones and Grant (1996) hypothesized that clear-cutting leads to increases in stormflow volume while road construction and wood removal from channels results in earlier, higher peak flows. Alterations in peak flow timing and quantity are of particular concern in watersheds with potential for snow accumulation and quick melt-off during rain-on-snow events (ROS), such as occurred during the 1996 flood. However, because the proposed project effects less than 1 percent of the forest cover in the project watersheds, its cumulative effects on stream flow cannot be directly measured within a reasonable degree of accuracy.

A preliminary analysis of the risk for cumulative effects to hydrologic processes, channel conditions and water quality for the Peak Creek and Oliver Creek sub-watersheds, was conducted utilizing the *Salem District Watershed Cumulative Effects Analysis Procedure, FY 1994*. The results of this analysis are presented below.

Preliminary Analysis Results-

Peak Creek

The Peak Creek 6th field watershed covers approximately 7,022 acres of which 3,489 (50 percent) are private land while the remaining 3,533 (50 percent) are managed by the BLM. 1,616 acres (23 percent) of the watershed is immature (consisting primarily of recent clear-cuts less than 10 years in age or agricultural land) while closed stands of conifer and deciduous species cover 4,304 acres (61 percent) of the watershed.

2,014 acres (58 percent) of the private forest stands in the watershed are old enough to be thinned or clear-cut harvested (greater than 40 years in age) within the next 10 years. Approximately 2,700 acres (76 percent) of public land is available for regeneration harvest or thinning within the next 10 years.

The transient snow zone (TSZ) comprises approximately 2,902 acres (41 percent) of the watershed. 1,567 acres (54 percent) of this zone is on public lands.

Currently, the average r factor value ("risk to increased peak flows") in the watershed is 1.44 (on a scale of 0-3, with 3 = high risk of increases to peak flows). 1,905 acres (27 percent) of the watershed is at moderate to high risk for alteration of peak flows.

The preliminary analysis indicates that currently a moderate risk level for cumulative effects to water quality, channel conditions and hydrologic conditions in the Peak Creek watershed exists. With the large acreage of upland forest available for harvest and/or thinning in the next ten years, potential exists for forest management to add cumulatively to the current levels. As a result, a more intensive analysis was conducted to further define risks.

A Level 1 analysis for increase in peak flows was conducted using the Washington State DNR watershed analysis methods and runoff model (Washington Forest Practice Board, 1997). Details

of the analysis are contained in a supplemental report (*Cumulative Effects Analysis for the Peak Creek Watershed*).

In summary, the analysis found a low sensitivity to increases in peak flows both for normal storm events and for severe events with a high likelihood of rain on snow events (ROS). The WAR model estimated no more than an 8.1 percent increase in peak flows above full forest cover. Predicted increases of less than 10 percent are considered to be within the range of method error. Therefore, it was concluded that the potential cumulative effects leading to increases in peak flows, under this proposal in conjunction with other likely actions in Peak Creek during the next decade, are low.

Oliver Creek

The Oliver Creek 6th field watershed covers approximately 6,874 acres of which 4,838 (70 percent) are private land while the remaining 2,036 (30 percent) are managed by the BLM. 1,856 acres (27 percent) of the watershed is immature (consisting primarily of recent clear-cuts less than 10 years in age or agricultural land) while closed stands of conifer and deciduous species cover 4,304 acres (63 percent) of the watershed.

2,576 acres (53 percent) of the private forest stands in the watershed are old enough to be thinned or clear-cut harvested (greater than 40 years in age) within the next 10 years. Approximately 1,400 acres (69 percent) of public land is available for regeneration harvest or thinning within the next 10 years.

The transient snow zone (TSZ) comprises approximately 1,488 acres (22 percent) of the watershed. 714 acres (48 percent) of this zone is on public lands.

Currently, the average r factor value in the watershed is 1.54 (on a scale of 0-3, with 3 = high risk of increases to peak flows). 2,283 acres (33 percent) of the watershed is at moderate to high risk for alteration of peak flows.

The preliminary analysis indicates that currently a moderate risk level for cumulative effects to water quality, channel conditions and hydrologic conditions in Oliver Creek watershed exists. Most of the risk involves private lands in agricultural zones. However, with the large acreage of upland forest available for harvest and/or thinning in the next ten years, potential exists for the forest management to add cumulatively to the current levels. As a result, a more intensive analysis was conducted to further define risks.

A Level 1 analysis for increase in peak flows was conducted using the Washington State DNR watershed analysis methods (Washington Forest Practice Board, 1997). Details of the analysis are contained in a supplemental report (*Cumulative Effects Analysis for the Oliver Creek Watershed*).

In summary, the analysis found an indeterminate sensitivity to increases in peak flows. WAR estimated an 11.8 percent increase in an unusual 2-yr peak flow above full forest cover. Therefore, it was concluded that potential cumulative effects leading to increases in peak flows, under this proposal in conjunction with other likely actions in Oliver Creek during the next

decade, cannot be ruled out. Therefore, it was suggested that additional information be collected/analyzed in order to provide a more detailed assessment of the risks to the aquatic system (i.e. a Level 2 assessment). Additionally, the analysis stated that, the indeterminate rating does not require that the actions considered under this proposal be delayed or postponed@. Rather, it points to the possibility of impacts to the aquatic ecosystem in the Oliver Creek watershed *at some point during the ten- year analysis period*. Furthermore, a WAR analysis that separated public from private actions in the watershed (see Appendix 3) found that the 10 percent threshold would be exceeded without any forest management on public lands.

Forest management on public lands alone (i.e. private lands remain un-harvested) is predicted to increase a 2-yr event (unusual storm) from 1190 cfs to 1287 cfs; an increase of 8.2 percent over hypothetical full forest cover and 1.3 percent over current conditions. Additionally, the increases predicted in this assessment remain far below the 20 percent increase in a 2-yr peak flow given as a threshold value for considering effects of increased bed mobility and bed scour.

Alternative 2 (No Action)

No action would result in the continuation of current conditions and trends at this site as described in the Description of the Affected Resource section of this report and in the South Fork Alsea, North Fork Alsea and Benton Foothills watershed analysis documents.

Alternative 4 (Deletion of Tractor Swing Yarding Area)

Under this alternative, the direct, indirect and cumulative effects to water quality, hydrological function and stream channel conditions would be similar to those for the proposed alternative except that any potential disturbance to streams from the tractor swing yarding project would be eliminated. A crawler would not be making repeated trips between two small, intermittent tributaries, thereby eliminating the potential for sedimentation in these streams.

G. RIPARIAN

Effects on long term instream large wood recruitment.

Affected Environment

Riparian Reserve Widths

Riparian Reserves in the proposed project would be 420 feet on each side of perennial fish-bearing streams and 210 feet on each side of intermittent and perennial non-fish bearing streams. These widths are in conformance with the *RMP* (p.10). Within these Riparian Reserves, stands would be thinned to densities ranging from 60 to 129 trees per acre. The actual riparian vegetation along streams would be excluded from treatment and designated as stream protection zones (SPZ). Only the upslope portions of the Riparian Reserves would be proposed for density management. See Appendix A-3 document for criteria used to identify stream protection zones.

Structure/Species Composition

The Riparian Reserves in the project areas consist of young managed stands (approximately 50 to 60 years), logged in the 1940's and 1950's. All are uniform, densely stocked Douglas-fir stands with relative densities over .60. Unit 17A was thinned 15 years ago and is therefore not quite as dense as the other three. All still have relatively high crown ratios (approximately 30 percent). Canopy closure averages 80 percent with little understory development. Hardwoods are scattered throughout the stands, but most occur along streams. Western hemlock occurs in all units as a minor species except Unit 19B, where it comprises almost 25 percent of the stand. Vegetation within the stream protection zones is largely the same as the rest of the stands, with a slightly larger component of hardwoods.

The stand between Unit 19C and Peak Creek is similar to the others, but was logged in the 1960's. It was considered for thinning, but the stocking was judged too variable, with dense areas mixed with more open areas.

Table 2: Stand Data[1]

Unit	Riparian Reserve Acres	Age	DBH (inches)	Trees per Acre	RD[2]	Crown Ratio	Av. Ht	Basal Area	Crown Closure percent
17A	12	61	DF:18.8 Hdwd: 15.0	DF: 106 Hdwd: 2	.60	.36	114	223	78
19A	40	49	DF: 10.2 WH:16.7	DF: 342 WH: 5 Hdwd: 22	.83	.27	119	244	76
19B	28	47	DF: 12.8 WH:13.0	DF: 166 WH: 65 Hdwd: 17	.74	.41	121	233	80
19C	25	60	DF: 12.8 Hdwd: 9.6	DF: 203 Hdwd: 22	.70	.28	126	223	82

1. Density Management in the Riparian Reserves is not proposed for Unit 17B and therefore it is not included in the tables.
2. RD (relative density) is a ratio: trees per acre in a stand adjusted to a 10 inch diameter, divided by the number of trees per acre in a fully stocked stand 10 inches in diameter (520 for DF). 0.35 is the point where growth slows from competition. 0.6 is the point where competition begins to cause mortality.

Forest Health

No phellinus was observed in Riparian Reserves, but it may be present in scattered pockets, as it is in the Matrix portions of the project areas.

There are two blow down areas: one is west of Peak Cr. adjacent to Unit 17A, and one is in the southwest corner of BLM land in section 17. Both were presumably caused by regeneration harvesting on adjacent private lands.

Terrestrial Coarse Woody Debris and Snags/(CWD)

The *SFAWA* does not specifically address CWD in the Riparian Reserves. The *RRTRU* recommends for density management projects in Riparian Reserves, that the recommendations of the wildlife biologist and the *Late-Successional Reserve Assessment, Oregon Coast Province-Southern Portion* (*LSRA*, June 1997) be followed. As Table 3 indicates, the proposed project areas exceed *LSRA* cubic foot down wood requirements, but lack adequate snags.

Table 3: Snags and Down Wood occurring in proposed project area

UNIT	CWD (cu. ft/Acre)[1]	CWD Decay Class 1-2 (pieces/ac greater than 8 feet, all conifer species)	CWD Decay Class 3-5 (pieces/ac greater than 8 feet, all conifer species)	Snags/ac less than 20" DBH[2]	Snags/ac greater than 20" DBH[3]
17A	3157	9 (321 cu ft)	140 (2836 cu ft)	less than1	1
19A,B	5301	15.5 (536 cu ft)	214.7 (4765 cu ft)	2	1
19C	6184	9 (241 cu ft)	138 (5943 cu ft)	10	less than 1

1 Using strategy #3 described in the *LSRA*, required short term CWD minimums from Table 12 (p.61) range between 525 and 2844 cubic feet.

2. According to the *LSRA*, less than 20 inch average snag levels in Oregon Coast Range natural stands range from 615 to 845 per acre (Table 11, p. 59).

3. According to the *LSRA*, greater than 20 inch average snag levels in Oregon Coast Range natural stands range from 3 to 31 per acre (Table 11, p.59).

Large Woody Debris (LWD) in Streams

Wood in tributary channels in the project area was not measured. However, observations of wood quantities were made during field survey work for the project. There are typically moderate to large amounts of wood (relative to other high gradient, intermittent channels in the Oregon mid-coast range) throughout the Peak Creek drainage. Much of this material remained after logging operations that occurred in the 1940's and 1950's when logging practices were typically "messy" (i.e., large quantities of wood considered of inferior quality were left behind). Recent additions of wood are predominately smaller sized deciduous species and occasional second growth conifer that has blown down or fallen over due to slope instability.

Riparian: Environmental Consequences

Alternatives 1 (Proposed Action) **Alternative 3** (Tractor Yarding Seasonal Restriction Change) and **Alternative 4** (Deletion of Tractor Swing Yarding Area)

Project 1 (Commercial Thinning and Density Management)

Some variable spacing would be accomplished by cutting extra trees in areas with a developing understory, or near trees with "wolfy" characteristics. In addition, extra trees would be reserved next to existing snags, creating small clumps of trees. Later when the Matrix lands are

regeneration harvested, emphasis in the Riparian Reserves would be to release conifer understory, create large diameter CWD and snags, and enhance variable spacing.

Desirable habitat for aquatic and riparian dependant species would be enhanced or maintained in the following ways:

Maintenance of stand health and stability

Stands grown under more open conditions become more wind firm than very dense stands, both because individual trees experience more wind as they develop and because trees with less competition maintain their live crowns longer, giving them a lower center of gravity and decreasing their height/diameter ratios. Thinning also encourages epicormic branching that also lengthens crowns. Some researchers suggest that wind firmness and individual tree stability are factors in a tree reaching ages of 300 and over. Crown ratios of untreated stands, including the stream protection zones fall below 0.3 sooner than the treated stands.

Long term increase in quality LWD recruitment

Near streams, but outside the stream protection zones, trees smaller than stand average and at a consequently higher risk of mortality, would reach an average 20" DBH more quickly with thinning, compared to the no treatment option, creating natural opportunities for larger LWD recruitment. Smaller wood would continue to fall from within the stream protection zone where no treatment takes place, and larger wood would begin to be recruited from higher up the slopes as the treated stands reach heights of 200 feet. Thus, wood with a larger range of sizes would potentially be recruited into streams over the long term in treated stands.

Maintenance of Shade

Stream protection zones would provide adequate shade, maintaining stream temperatures. Perennial streams (potentially subject to summer heating) with less topographic shading would have wider stream protection zones. No SPZ would be narrower than 50 feet, while most would be wider.

Restored structural complexity of the stands:

The proposed action would increase the amount of light penetrating the canopy, which would promote growth and development of vegetation found at mid canopy and ground levels. It is expected that understory initiation of shade tolerant conifers associated with canopy layering would be promoted in areas of increased light over the long term. In the short term a more complex understory would develop, consisting of more shrub species.

Accelerated development of desired tree characteristics:

Residual trees would increase in diameter and crown depth/width. Limb diameter on large limby trees would be maintained by releasing those trees to an open grown condition. The long-term results of density management would be larger average DBH, and larger crowns (higher crown

ratios) at any given age, compared to the no treatment option. As Tables 3 through 6 indicate, diameters 45 years in the future in the treated stands would range from 14 percent to 27 percent larger, (Douglas-fir DBHs increase by 25 percent in Unit 19A, although western hemlock diameters in that unit remain almost the same for either treatment). Crown ratios, which are indicators of wind firmness and crown depth would range from 9 percent to 18 percent higher. Relative density (RD in the tables) is an indicator of mortality from competition: a lower RD indicates a higher chance for understory development. RDs are lowered by density management, and remain relatively low 45 years later.

Table 4: Unit 17A, Treatment vs. No Treatment 45 years in the future[1]

Treatment	Age	DBH	Trees/Ac	BA[2]	RD	Crown Ratio	Age QMD[3] reaches 20"
Original Stand	61	18.8	108	223	0.60	.36	
Proposed Treatment Thin to 160 BA DF only	61	22.0	60	160	0.42	0.38	
No Treatment	106	24.3	93	318	0.78	.21	66
With Treatment	106	28.5	58	264	0.61	0.25	61

1. In order to compare results of the proposed treatments versus no treatment, the stands were modeled using Organon, SMC, version 1.0, a growth and yield model developed by OSU. Numbers generated by growth and yield models can be used as a relative comparison of treatments in a given stand, but are not necessarily accurate predictions of future growth. Future stand measurements are dependent on disturbance patterns and other stochastic events which can never be accurately predicted.
2. Includes hardwood basal area
3. QMD = Quadratic mean diameter, which is the diameter of the tree of mean basal area.

Table 5: Unit 19A Treatment vs. No Treatment 45 years in the future

Treatment	Age	DBH	Trees/Ac	BA[1]	RD	Crown Ratio	Age QMD reaches 20"
Original Stand	49	DF: 10.2 WH: 16.3	369	244	0.83	0.27	
Proposed Treatment Thin Dfto BA 110 Cut Df only	49	DF: 16.5 WH: 16.7	99	128	0.38	0.39	
No Treatment	94	DF: 19.3 WH: 24.0	160	339	0.91	0.22	99
With Treatment	94	DF: 25.8 WH: 25.6	92	291	0.72	0.27	69

1. Includes hardwood basal area

Table 6: Unit 19B: Treatment vs. No Treatment 45 years in the future[1]

Treatment	Age	DBH	Trees/Ac	BA[1]	RD	Crown Ratio	Age QMD reaches 20"
Original Stand	47	DF: 12.8 WH: 13.0	248	233	.74	.41	
Proposed TreatmentThin to BA140 Cut DF and WH	47	DF: 17.5 WH: 15.9	104	147	.43	.41	
No Treatment	92	DF: 16.6 WH: 15.4	203	308	.89	.28	107
With Treatment	92	DF: 22.6 WH: 19.0	99	226	.60	.31	87

1. Includes hardwood basal area

Table 7: Unit 19C: Treatment vs. No Treatment 60 years in the future[1]

Treatment	Age	DBH	Trees/Ac	BA[1]	RD	Crown Ratio	Age QMD reaches 20"
Original Stand	60	12.8	225	223	.7	.28	
Proposed Treatment Thin to BA160 Cut DF	60	15.2	129	173	.51	.30	
No Treatment	105	18.2	155	288	.80	.19	120
With Treatment	105	21.2	115	254	.70	.21	100

1. Includes hardwood basal area

Desirable terrestrial down wood and snag characteristics would be enhanced in 2 ways:

1.Trees smaller than stand average and at a consequently higher risk of mortality, would reach an average 20" DBH more quickly, compared to the no treatment option, creating natural opportunities for larger snag/CWD formation. Average diameters (QMD in Tables 4-7) reach 20 inches 5 to 30 years earlier in the treated stands.

2. CWD and snag enhancement would be achieved using strategy # 3 as described in the *LSRA* (p.68). This strategy creates some short term CWD and snags, but reserves most as green trees to maximize long-term quantities and sizes of CWD and snags. Post harvest monitoring would be done to evaluate the size and condition of snags and CWD. It is expected that harvest operation would create some CWD and possibly knock down some snags. Creation of CWD during harvest could come from harvest activities, post harvest windthrow, and beetle kill. The monitoring would be done three years after the harvest has maximized opportunities for natural creation of CWD and snags. After monitoring, trees would be cut and left and snags would be created where needed to meet recommendations of the wildlife biologist. Most CWD and snags would be left as green trees until the Matrix portion of the project area is regeneration harvested, at which time additional CWD and snags would likely be created in the Riparian Reserves.

Opening up the canopy may cause such ground level microclimatic changes as increased light levels, increased temperatures, lower humidity and increased wind speed. These effects vary depending on aspect, slope and vegetation removed and are difficult to quantify. It is expected most microclimate changes near streams would be mitigated by the stream protection zones.

Those that occur further from the streams would be of short duration and would be ameliorated as crowns close and brush covers the ground.

There would be a short term elevated risk of Douglas-fir bark beetle infestation in healthy standing trees, due to unyarded cut trees, windthrow, and logging damage to residual trees. Bark beetle infestation risk may be minimized by following guidelines developed for the Siuslaw National Forest. A summary of those guidelines is attached.

Project 2 (Bed load trapping and stream gradient reduction)/ Project 4 (Fish habitat enhancement)

Immediately after the sale approximately 4 trees per 1000 feet of stream (or 4 trees per acre) would be felled into the fish bearing stream in Unit 19A from within the stream protection zone. These trees would be average stand diameter or larger and would represent the largest trees to fall into the stream for the next 30 years. This is because the vast majority of trees to die and fall in the short term would come from the SPZ where no other treatments are proposed and most LWD would be less than 10". Additionally, these felled trees are the only ones guaranteed to fall into the streams, with all others falling naturally in generally random directions. Trees added to Peak Creek below the culvert on road 14-6-19 would trap sediment, aggrading the stream and increasing fish passage.

Project 3 (Releasing wolf trees)

Releasing trees in the stand between Unit 19C and Peak Creek to an open grown condition would increase crown ratios and maintain large branches on the largest trees enhancing habitat for riparian and/or late successional species.

Project 4 (Fish habitat enhancement)

Structural components of late-seral forest (large trees, multiple canopy layers, large hard snags, heavy accumulations of down wood, and species diversity) would be maintained. The canopy and understory would remain intact which should keep the microclimate disturbances to a minimum.

Project 5 (site preparation and conifer planting)

This project would occur outside Riparian Reserves.

Alternative 2 (No Action)

There would be no disturbance due to management and consequently no short term microclimate changes in the Riparian Reserves. There would be no short term elevated risk of bark beetle infestation. However, as stand health is compromised over time due to high densities, risk of long term beetle infestation is increased. Trees would continue at their present rate of growth, slowing as the canopy closes and competition for light becomes more intense. Stand mortality due to competition would increase, creating increased amounts of small CWD and snags. Crown ratios

would decrease at a faster rate compared to Alternative 1. Wind firmness and individual tree stability would decrease as crown ratios decrease. The canopy would remain closed, allowing little light to penetrate to the ground. The relative density (RD) of the stands, as modeled in Organon, would remain higher than 0.6 if left untreated for 45 years (Tables 3 - 6), which is considered the point where mortality due to competition begins. Therefore it can be concluded that no significant understory would develop within the next 45 years and beyond without density management.

Natural disturbance would be the agent for creation of stand structural diversity. The most likely agent for this disturbance would be wind, which would create openings in patches. It is unknown how long it would take for natural disturbance to create the structural and species diversity needed in these watersheds, but it is expected, based on experience and a considerable body of research, that this diversity would take considerably longer to develop than if the proposed treatment were implemented.

H. FISHERIES

Effects on resident and anadromous fish and the aquatic habitat.

Affected Environment

A tributary to Peak Creek runs through the project area. This tributary runs through a flat meadow depositional area that is dominated by young alders, old beaver dams and riparian shrubs. The channel is dominated by clay, sands and fine organic material. Resident cutthroat trout (*Oncorhynchus clarki*) and Sculpin (*Cottus sp.*) are present throughout this tributary in section 19, but were not found in the unit 17A in section 17. It was not determined where fish passage or barriers are for this stream. The stream that runs on the west side of Unit 17A is full of large wood due to a timber buffer that blew over. Fish were also found in the tributaries in the northeast corner of section 19 (trib A) and the second order stream that runs into the main tributary from the south (Trib B, see Appendix A-2). Both of these streams empty into the main tributary to Peak Creek within a broad valley meadow, and derive from a small moderate v-shaped valley form. Both tributaries have moderate to large quantities of older (decaying) large wood within the channel, are dominated by gravels, cobbles and sand and have good habitat conditions for fish. Tributary A has a fish passage barrier due to a large culvert step on private land in section 18.

Listed Fish Species

Coastal Coho Salmon (*Oncorhynchus kisutch*) are listed as threatened under the Endangered Species Act. Conferencing with the NMFS on this proposed project would be conducted in accordance with current BLM policy. Coho Salmon are down stream from the proposed units at least 1.75 miles.

Fisheries: Environmental Consequences

Alternative 1 (Proposed Action) and **Alternative 3** (Tractor Yarding Seasonal Restriction Change)

Project 1 (Commercial thinning and Density Management)

The compacted skid trail from swing yarding would be stripped of forest vegetation and may channel water causing scour and erosion within close proximity to streams. Areas where equipment turns or backs around on, multiple times would experience heavy compaction and disturbance to the topsoil layer and vegetation. This disturbance would increase the risk of sediment delivery to adjacent streams Design features and mitigation measures (water bars and slash) would keep sediment delivery to a minimal level. If negative impacts occurred from sediment delivery they would likely be short term, however, as stated in the water section, increases would be immeasurable and would not affect resident fish that are adjacent to the unit.

The remainder of this alternative would have no measurable adverse impacts to resident or anadromous fish and fish habitat. Habitat and channel conditions are to be maintained. Skyline yarding in sloped areas, the small amount and size of timber being yarded out in conjunction with stream protection buffers and seasonal restrictions would keep sediment delivery to streams to a minimal level. Ground based yarding would occur on slopes under 35 percent. This would keep compacted skid trails from channeling water and sediment delivery to a minimum.

Thinning within the riparian area would enhance stand conditions, growing trees faster than if the stand were to grow naturally. This would increase the potential for high quality large woody debris and increase species diversity.

Roads

All roads being constructed would be built on ridge tops, except for the road into unit 19A. This road is approximately 100 feet from a stream origin and is fairly flat. Any disturbed soil or channeling water from the road would be filtered by forest brush, duff and debris on the forest floor. This intermittent stream would not be impacted by the road construction.

All road work would be seasonally restricted and hauling would be closely monitored and mitigated to avoid water quality degradation.

Project 2 (Bed load trapping and stream gradient reduction)

Approximately 4 trees would be felled into Peak Creek below a culvert that currently has a small step (+/- 8 inches). This small jam would slow stream velocity and allow material to settle in front of the culvert. As the stream aggrades the step would get smaller and smaller allowing for easier fish passage. Small, short-term increases in turbidity are likely due to bank scouring. However, increases in turbidity would be short term due to vegetation on stable banks. This increase in turbidity would likely settle out just down stream due to the low depositional nature of this stream.

Trees felled within the stream channel could increase short term stream bank scouring. This would most likely occur within the first bank full event and would be taken down stream. This impact would not adversely affect fish other than increasing turbidity short term, during large rain events.

Project 3 (Releasing wolf trees)

Thinning within the riparian area would enhance stand conditions, growing trees faster than if the stand were to grow naturally. This would increase the potential for high quality large woody debris and increase species diversity.

Project 4 (Fish habitat enhancement)

This would promote complex and diverse habitat types for fish in this stream. Currently there are moderate to large amounts of LWD, but the majority of this material is older wood. Large woody debris dropped into the stream channel in unit 19A would enhance and preserve habitat complexity for fish until natural mortality of trees recruit more large woody debris. Dropping trees into the channel would increase complexity and diversity of habitat conditions for resident fish. Small, short-term increases in turbidity are likely due to bank scouring. However, increases in turbidity would be very short-term and a very small amount due to vegetation on stable banks. This increase in turbidity would likely settle out just down stream due to the low depositional nature of this stream. Immediate benefits to fish habitat would occur in this reach. Logs would provide structure for in-stream diversity, slow water velocity, create pools, increase pool depth and trap gravels for spawning habitat. Pools formed by structures would provide summer and winter rearing habitat and hiding cover. Deeper pools would reduce water temperature during low summer flows. The structures would also slow the velocity of winter flow so small fry would not be prematurely washed down stream.

Project 5 (Site preparation and conifer planting)

The project would not impact fish habitat and would be located outside Riparian Reserves.

Alternative 2 (No Action)

No action would result in the continuation of current habitat conditions and trends at this site.

Alternative 4 (Deletion of Tractor Swing Yarding Area)

Soil compaction, sediment delivery and ground disturbance would not occur between streams in unit 19C. Negative impacts due to swing yarding (unit 19C) within the stream influence zone would not occur.

I. WILDLIFE

Issue: Effects on special status species, special attention species and on wildlife habitats.

Affected Environment

Terrestrial Wildlife Habitat

All five proposed units are part of a mid-seral (40-79 years old) conifer forest in sections 17 and 19. Mid-seral forests in the Coast Range of Oregon are currently dominated by Douglas-fir with scattered and clumped western hemlock and various hardwoods. These forests have stands with a single-layered, dense, overstory canopy and little to no large wood, dead or alive, either standing or down, remaining from the previous stand. Currently the stands have hard (Class 1 and 2) snags and coarse woody debris but they are all in the smaller diameter classes.

Special Status Species

Northern Spotted Owl (Strix occidentalis)

The project area has no suitable habitat for foraging or nesting of spotted owls. The area is not designated as Critical Habitat, or Reserve Pair Area habitat for northern spotted owls. The mid-seral (40 to 80 years) habitat in sections 17 and 19 provides dispersal habitat for owls. The closest known active northern spotted owl site (Peak Creek, T. 14 S., R. 7 W., Section 1) is 1.6 mile to the northwest of unit 17A. The closest patches of suitable nesting habitat are more than 0.5 mile from any of the proposed sale units.

Marbled murrelet (Brachyramphus marmoratus)

There is no suitable habitat for marbled murrelets. The area is not formally designated as Critical Habitat in any of the five proposed harvest units in the project. Some potential habitat occurs within 0.25 mile of several units. The closest patches of suitable habitat are more than 0.5 mile from any of the proposed sale units. The closest known occupied marbled murrelet site (Tobe Creek, T. 14 S., R 7 W., Section 19) is over five miles to the west of the project area.

SEIS Special Attention Species (Survey and Manage)

Mollusks

The entire project area is considered to be suitable habitat for the Oregon Megomphix (Megomphix hemphilli, a category "A" in Table 1-1, Appendix B-3).

Inventory of the project area for Oregon Megomphix would be accomplished in accordance with the survey protocols as spelled out in IM OR-1998-097: *Survey and Manage Survey Protocols – Mollusks,* August 31,1998. The proposed harvest units were surveyed during spring/summer/ 2002. As a result of completed surveys 8 known megomphix sites were identified (See Appendix

A-2). As a result of a fall 2003 survey of proposed area to be site prepped and planted, 1 known megomphix site was identified. An additional survey of the proposed area to be site prepped and planted would be completed during spring 2003.

Red Tree Voles (Arborimus longicardus)

Units 17A, 17B, and 19C have an average DBH of greater than or equal to 16 inches, which is the threshold for vole surveys.

Inventory of Units 17A, 17B and 19C was accomplished in accordance with the survey protocols as spelled out in IM-OR-2000-037: *Survey and Manage Protocol – Oregon Red Tree Vole, Version 2.0,* dated February 18, 2000. Three trees with stick nests were found in Unit 17A and were subsequently climbed. No active red tree vole nests were found during climbing. An inactive red tree vole nest was found in unit 19C. An intensive survey was done within 100 meters of the inactive nest tree and no other nests of any kind were found. This inactive nest would not require protection under the current survey protocol and management recommendations.

Wildlife: Environmental Consequences

Alternative 1 (Proposed Action) **Alternative 3** (Tractor Yarding Seasonal Restriction Change) and **Alternative 4** (Deletion of Tractor Swing Yarding Area)

Project 1 (Commercial Thinning and Density Management)

Terrestrial Wildlife Habitat

The Matrix thinning and Riparian Reserve density management prescriptions for the proposed alternative would remove the suppressed, intermediate, and smaller co-dominant Douglas-fir and western hemlock and leave the dominant and larger co-dominant conifers. Post-treatment densities would range from approximately 60 to 110 trees per acre. Since the largest trees with the best crown ratios would be left the post-treatment crown canopy is expected to be 50 percent or greater over most of the action area. Currently the stands have hard (Class 1 and 2) snags and hard woody debris but they are all in the smaller diameter classes. Management would abbreviate the recruitment time necessary for the development of larger (greater than 20 inches) hard snags, coarse woody debris, and a more complex overall stand structure which could improve potential for cavity nesting birds. A short term impact would be a simplification of stand structure due to the removal of trees, however, the planned treatment would have little impact on the composition and function of these mid-seral stands.

Special Status Species

Northern Spotted Owl

The proposed action would have no negative impact on owl nesting/foraging/roosting habitat and no significant impact on dispersal habitat. The long-term impact of density management on owl habitat in the Riparian Reserve would be positive as it would develop into suitable nesting/foraging/roosting habitat sooner then if left unthinned. The proposed project is considered a "May affect, not likely to adversely affect" northern spotted owl dispersal habitat in the Matrix and in the Riparian Reserve.

Marbled Murrelet

The proposed action would have no impact on murrelet potential or suitable habitat. The long term impact of density management on murrelet habitat in the Riparian Reserve would be positive as it would develop into suitable habitat sooner then if left unthinned. The proposed project is considered a "May affect, likely to adversely affect" marbled murrelet for noise disturbance to adjacent unsurveyed potential habitat during the breeding season.

SEIS Special Attention Species (Survey and Manage)

Mollusks

Unmitigated ground-based and skyline yarding may cause direct injury, and a reduction in overstory canopy may cause habitat modification leading to indirect injury by desiccation.

Project 1 would have no appreciable impact to known *Oregon Megomphix* sites either in the Matrix or in the Riparian Reserve.

Red Tree Vole

The proposed action would have no affect on red tree vole, either in the Matrix or in the Riparian Reserve land use allocation.

Project 2 (Bed load trapping and stream gradient reduction) Project 3 (Releasing wolf trees) Project 4 (Fish habitat enhancement) and Project 5 (Site preparation and conifer planting) .

The felling of scattered trees and brush within the project area would not destroy or adversely modify critical or dispersal habitat for the northern spotted owl or the marbled murrelet.

Alternative 2 (No Action)

Under the no action alternative the uniform, single layered, mid-seral stands would continue to grow and develop into late-seral size and structure at a slower rate then if released through thinning. There would be no impacts to the mid-seral dependent wildlife species currently using these stands for nesting, foraging, dispersal, resting, and escape habitat

Comparison of Environmental Consequences, by Alternative, for Identified Issues (Alts. 1 and 2)

Resource	Alternative 2	Alternative 1
Vegetation	Stands needing treatment would be deferred, resulting in a loss of late-successional forest or timber stand enhancement. The number and diversity of understory and shrubs/forbs species in many areas may remain low. Blow-down trees may occur from winter storms creating habitat for the Douglas-fir bark beetle, and small infestations may become established in the dying trees. The predicted "no action" growth for individual trees would be slow compared to Alternative 1	**Project 1 (Commercial Thinning and Density Management)** Road construction would result in the removal of vegetation on 1 acre and removal of mineral soil on the actual road grade. Thinning approximately 212 acres would decrease the percent canopy cover in the project area in the short term. A decrease in the canopy density would increase the amount of available sunlight to the canopy and forest floor, resulting in accelerated growth to the reserved conifers, hardwoods, shrubs, and forbs within the project area. Some of the reserved species may be damaged through logging and road construction activities. No significant impact to the residual stand is anticipated however, older forest characteristics for reserved wildlife trees and improved wood quality on leave trees planned for future harvest are expected to be achieved Trees grown in more open conditions become more wind firm than those in very dense stands, Limb diameter on large limby trees would be maintained by releasing those trees to an open grown condition. The long-term results of density management would be larger average DBH, and larger crowns (higher crown ratios) at any given age, compared to a no treatment option. This action would open the currently dense canopy allowing more light to reach the forest floor and subsequently increase ground cover growth. Douglas-fir bark beetle infestations may occur in the felled trees. Some additional standing, healthy or weakened trees within the project area may be killed in subsequent years by beetle infestations. It is not anticipated that any widespread infestation would occur. Site preparation and planting of a two acre blowdown area with conifers would put two acres of Matrix land back into conifer timber production

Resource	Alternative 2	Alternative 1
Soils	Continuation of current conditions.	Constructing 3,200 feet of new road would result in loss of top soil and compaction of soil on approximately 1.2 acres of forested land and convert it to a non-forest road condition, (about 0.5 percent of the total project area). In the worst case, following completion of the project, the area would have about 8.4 percent of total acreage with some level of unmitigated soil compaction / disturbance. . Residual compaction within RMP standards. The risk of surface erosion is expected to be minimal for most of the area It is unlikely that the proposed project would increase the risk for surface erosion. Minor quantities of soil may enter the stream primarily where the trees are felled into or immediately adjacent to the stream. Compaction of the surface soil from the felling of the trees would be negligible since the trees would remain in place where they are felled.
Fuels	Short-term conditions would remain as they are at present. Risk of catastrophic consequences due to wildfire may increase.	Fuel loading and fire risk would increase at this site as a result of the proposed action. The increase in overall slash within the units, created by the proposed thinning would result in a higher risk of fire on the thinned sites following logging. The proposed projects could slightly increase fuel loading and risk of fire spread and intensity after trees are on the ground and brush is cut within site prep area. The creation of dead fuels from the tree crowns would pose a minor increase in risk but this is expected to diminish within a few years. Most of the project activity would occur in isolated areas away from roads or trails or other points of human activity.
Water/Riparian	Continuation of current conditions. No effects to aquatic ecosystem.	This proposal is unlikely to impede and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy (ACS). Over the long term, this proposal should aid in meeting ACS objectives by speeding the development of older forest characteristics in the riparian zone, which in turn increases streamside shading and the potential for large woody debris contributions into stream channels.

Resource	Alternative 2	Alternative 1
Wildlife/ Fisheries	Continuation of current habitat conditions and trends	No significant impacts to known Oregon Megomphix sites either in Matrix or in the Riparian Reserve. No affect to red tree vole either in the Matrix or Riparian Reserve. The proposed project is considered a "may affect, not likely to adversely affect" on northern spotted owl dispersal habitat in the Matrix and in the Riparian Reserve. The proposed project is considered a "may affect, likely to adversely affect" marbled murrelets for noise disturbance during the breeding season. Thinning could abbreviate the recruitment time necessary for development of larger (greater than 20") hard snags, CWD, and for the development of a more complex overall stand structure. Outside the tractor swing yarding area - The proposed action would have no measurable adverse impacts to local fish and fish habitat. Habitat and channel conditions are expected to be maintained. Inside the tractor swing yarding area - Impacts may occur due to small inputs of sediment, but would be short term (a year or less). Although, stream sedimentation due to surface erosion is unlikely to occur, if negative impacts occurred from sediment delivery they would likely be short term, but could increase stream turbidity. Fish down stream from the swing yarding area would not be affected due to the timing of increased sediment delivery, the small amount that would be produced, and the short duration of sediment delivery. Small, short-term increases in turbidity are likely due to bank scouring. However, increases in turbidity would be short term due to vegetation on stable banks. This would most likely occur within the first bank full event and would be taken down stream. This impact would not adversely affect fish other than increasing turbidity short term, during large rain events. Dropping trees into the channel would increase complexity and diversity of habitat conditions for resident fish. Immediate benefits to fish habitat would occur in this reach. Logs would provide structure for in-stream diversity, slow water velocity, create pools, increase pool depth and trap

Resource	Alternative 2	Alternative 1
		gravels for spawning habitat. Pools formed by structures would provide summer and winter rearing habitat and hiding cover. Deeper pools would reduce water temperature during low summer flows. The structures would also slow the velocity of winter flow so small fry would not be prematurely washed down stream.

Key	
Project 1 (Commercial Thinning and Density Management	
Project 2 (Bed load trapping and stream gradient reduction) Project 3 (Releasing wolf trees) Project 4 (Fish habitat enhancement) and Project 5 (Site preparation and conifer planting) .	
Projects 1 – 5	

V. MONITORING

Monitoring would be accomplished through timber sale administration and in accordance with monitoring guidelines in the RMP, Appendix J**.** Conifer understory seedlings, both planted and natural regeneration would be monitored at intervals from 1-3 years or until the understory has satisfactorily developed to determine if replanting or release from brush competition is necessary. Further in the future, both understory and overstory would be evaluated for further density management in order to manage for structural and species diversity.

VI. CONSULTATION

To comply with Section 7 of the Endangered Species Act (ESA), the Mainline Thinning and Restoration Project was submitted for consultation with the USFWS as part of the *Programmatic Biological Assessment in the North Coast Province for Fiscal Year 2003-2004 Projects Which Would Modify the Habitats of Bald Eagles, Northern Spotted Owls, and Marbled Murrelets.* This consultation was concluded with the USFWS issuing a Biological Opinion (BO; tracking number 1-7-02-F-956, July 24, 2002). The BO determined that the level of any anticipated incidental take is not likely to result in jeopardy to the bald eagle, northern spotted owl, or marbled murrelet. All applicable Terms and Conditions of this BO have been incorporated as design features of this proposed project.

To comply with Section 7 of the Endangered Species Act (ESA), the Mainline Thinning and Restoration Project was submitted for consultation with the National Marine Fisheries Service (NMFS). The Level 1 Team that assesses potential impacts to listed fish determined that the proposed project is a "Not Likely to Adversely Affect" Oregon coast coho salmon. The Biological Assessment was submitted to the National Marine Fisheries Service (NMFS) during January of 2003**.** The Letter of Concurrence was received from NMFS on February 21, 2003 with the determination that the proposed project is Not Likely to Adversely Affect Oregon Coast coho salmon. Any decision on the proposed Mainline Thinning and Restoration Project would be in compliance with the Letter of Concurrence.

In addition to the interdisciplinary team that developed and reviewed this proposed action, the following agencies or individuals

U.S. Fish and Wildlife Service, Regional Office, Portland
National Marine Fisheries Service
Flat Mountain Riders Association
Oregon Natural Resources Council, Eugene
Coast Range Association
Associated Oregon Loggers
Oregon Department of Forestry
Oregon Department of Environmental Quality
Oregon Department Fish and Wildlife
Oregon Division of State Lands

Oregon Water Resources Division
Audubon Society
Weyerhaeuser Timber Company
Hull Oakes Lumber Company
Swanson Forest Products Group
Confederated Tribes of Grande Ronde
Confederated Tribes of Siletz
Siuslaw National Forest
Siuslaw Timber Operators
Benton County
Marys River Watershed Council
Northwest Environmental Defense Center
Assorted Individual Citizens (List in EA file)

VII. INTERDISCIPLINARY TEAM MEMBERS

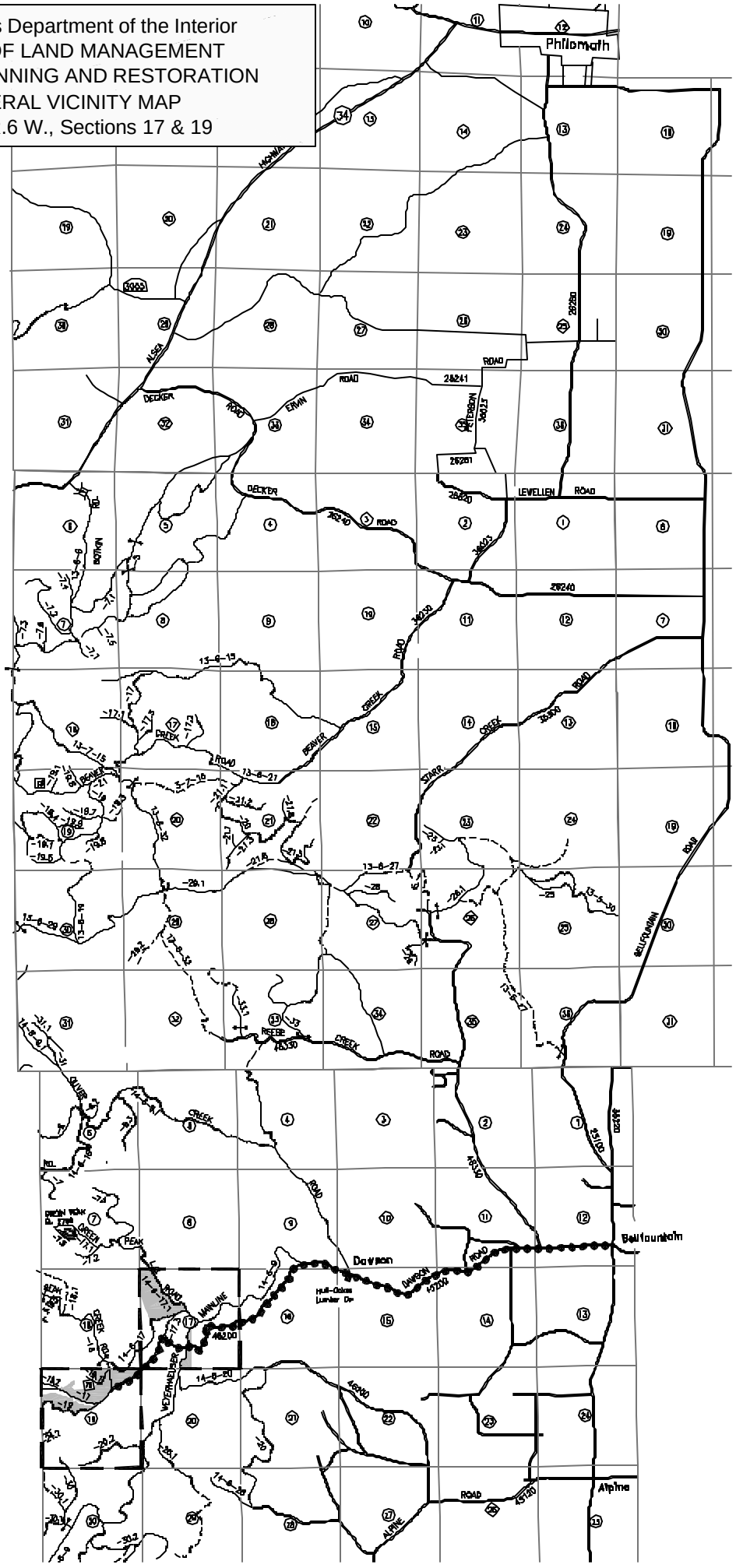
NAME	RESOURCE ASSIGNED	DATE/INITIAL
Phil Sjoding	Team Lead	3/7/03 GLH for PS
Dan Schreindorfer	Logging Systems/layout	3/10/03
Gary Licata	Wildlife	3/10/03
Tom Tomczyk	Soil/Fuels	3/10/2003 TST
Bill Caldwell	Silviculture	3-6-03
Ron Exeter	Botany	MAR 10, 2003
Tom Vanderhoof	Cultural	3/10/03
Steve Liebhardt	Fisheries	3/11/03
Ashley La Forge	Hydrology	3/10/03
Russ Buswell	Road Engineering	3/10/03
Amy Haynes	Riparian Ecology	3/10/03

Appendix A-1: General Vicinity Map
Appendix A-2: EA Maps

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
MAINLINE THINNING AND RESTORATION
GENERAL VICINITY MAP
T.14 S., R.6 W., Sections 17 & 19

Sale area

Access route



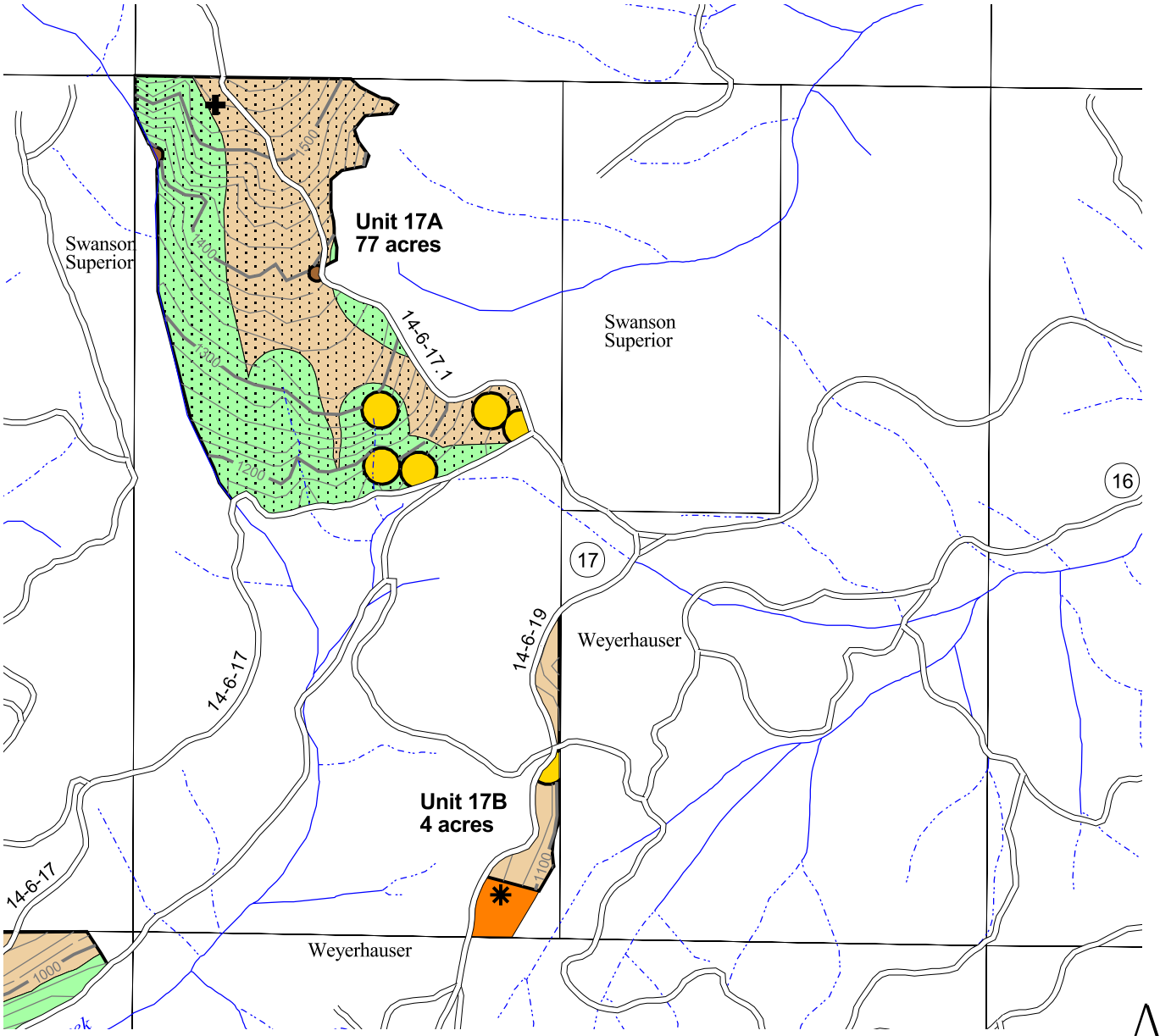
March 5, 2003

March 3, 2003

United States Departement of the Interior
BUREAU OF LAND MANAGEMENT

MAINLINE THINNING and RESTORATION - EA MAP

T.14S.,R.6W., Section 17, W. M. - SALEM DISTRICT - OREGON



Note: Unit acres do not include road widths or reserves.

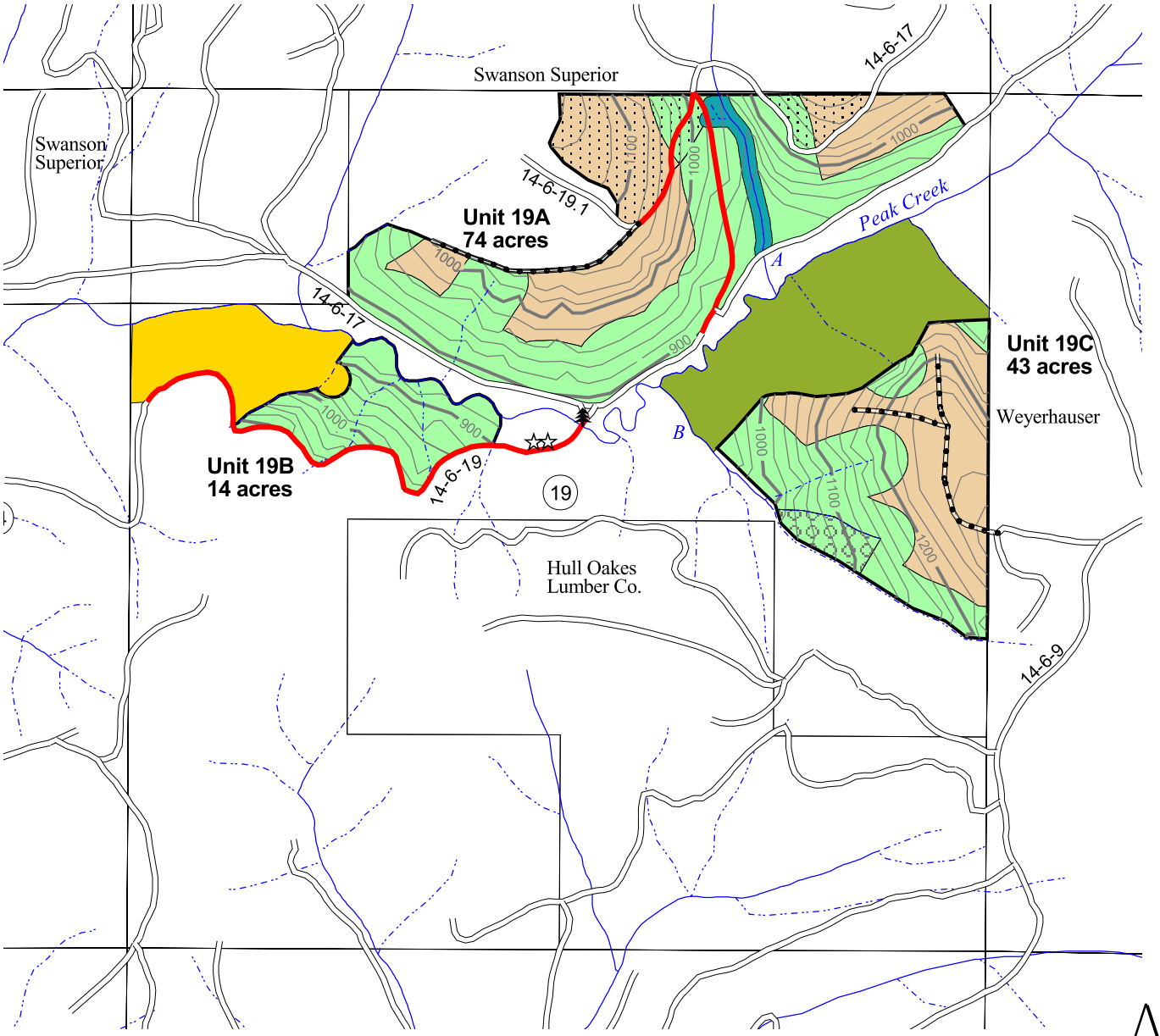
LEGEND

- Existing Road
- New Construction
- Road to be Renovated
- 100' Contours inside Units
- Contours inside Units
- Non fishbearing stream
- Fishbearing stream
- Big Leaf Maple clump to be protected
- Special marks
- Plus-tree
- Project 2 (Bed load trapping and stream gradient reduction)
- EA Unit Boundaries
- Ground based yarding
- Skyline yarding
- Tractor swing yarding
- Density managent area (riparian reserve)
- Commercial thinning area (matrix)
- Project 3 (Releasing wolf trees)
- Project 4 (trees to be cut and left within stream protection area)
- Project 5 (Site preparation and planting)
- Deferred area - Fungus Protection Area
- Deferred area - Mollusk Protection Area

Scale: 1" = 1,000'

March 3, 2003

United States Departement of the Interior
BUREAU OF LAND MANAGEMENT
MAINLINE THINNING and RESTORATION - EA MAP
T.14S.,R.6W., Section 19, W. M. - SALEM DISTRICT - OREGON



Note: Unit acres do not include road widths or reserves.

LEGEND

- Existing Road
- New Construction
- Road to be Renovated
- 100' Contours inside Units
- Contours inside Units
- Non fishbearing stream
- Fishbearing stream
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- Project 4 (trees to be cut and left within stream protection area)
- Project 5 (Site preparation and planting)
- Deferred area - Fungus Protection Area
- Deferred area - Mollusk Protection Area

Scale: 1" = 1,000'

APPENDIX A-3: CRITERIA FOR IDENTIFYING NO-CUT STREAM BUFFERS

1) A Stream Protection Zone would be flagged to exclude the following areas based on field identified features. Activities may occur in this area, but material would not be removed and heavy machinery or equipment would not be allowed.

a. Slope break- a point from which the slope is actively eroding and contributing sediment to the stream.

b. Floodplain- flat, accessed by the stream once in a blue moon.

c. Stream banks- feature that contains the "active" stream channel.

d. High water tables- flat, mushy soils, skunk cabbage, standing water, etc.

e. Flood prone- 2 x max depth @ bankfull (for streams with none of the above).

2) "Minimum" would be modified based on associated issues or identified risks. Examples include-

a. Perennial streams at risk for temperature increases due to the action (i.e., southern aspect, low topographic relief, vegetation provides significant shading). We can either extend the minimum to 100 feet at these sites or apply a model to get more precise in our estimate.

b. Unstable slopes- this is open to discussion. We may want to thin along debris torrent prone headwater channels even though they are potentially "unstable" because these areas are significant LWD source areas. However, actively eroding sites adjacent to streams with ravel on the surface and "jack-strawed" trees may be excluded.

c. "Sensitive" streams- sand bed channels or channels with high residual impacts (bank erosion, incision, heavy fine sediment load, etc) may warrant extra protection.

Appendix B-1 Aquatic Conservation Strategy Objectives Review Summary

ACS Objective	How Project Meets the ACS Objective
1. Maintain and restore distribution, diversity, and complexity of watershed and landscape features to ensure protection of aquatic systems.	**Alternatives 1 (Proposed Alternative), 3 & 4:** Project 1& 3 Only 10 percent of the stands in the South Fork Alsea watershed are currently classified as having an understory. Most mid-seral stands (age 30-80) are uniform evenly-spaced Douglas-fir stands (*RRTU*, p.3). Generally the watershed lacks large woody debris potential for streams (*SFAWA*, p.65) and lacks snags, down wood, sub-canopy layers and species diversity (*SFAWA*, p. 40). The proposed density management project would be a means to enhance late-successional forest conditions and speed up attainment of these conditions across the landscape. Releasing wolf trees in the Riparian Reserves adjacent to Peak Creek to an open grown condition would enhance stand and individual tree structure, thereby increasing late-successional conditions across the landscape. Since Riparian Reserves provide travel corridors and resources for aquatic, riparian dependant and other riparian and/or late-successional associated plants and animals, the increased structural and plant diversity would ensure protection of aquatic systems by maintaining and restoring the distribution, diversity and complexity of watershed and landscape features. Project 2 Felling trees into Peak Cr below the culvert would allow for easier fish passage (EA p. 52) below one culvert in the watershed. This would have a negligible effect on the landscape as a whole, but would benefit one small portion of Peak Creek. Project 4 Dropping trees into the channel would allow habitat conditions to increase in complexity and diversity for resident fish (EA p. 53), thereby restoring distribution, diversity and complexity of watershed and landscape features. Project 5 Replanting the blowdown area would restore conifers while maintaining some big leaf maple. This would maintain species diversity within a small area of the watershed. **Alternative 2 (No Action)** It is unknown how long it would take for natural disturbance to create the structural and species diversity needed in the watershed, but it is expected that it would take considerably longer to develop. Fish passage in Peak Creek and fish habitat within the project area would remain in its current condition.

2. Maintain and restore spatial connectivity within and between watersheds.	**Alternatives 1, 3 & 4** <u>Projects 1 & 3</u> Long term connectivity of terrestrial watershed features would be improved by enhancing conditions for understory development (structural diversity), increasing the proportion of minor species in the stand (species diversity), increasing growth rates on remaining trees, creating fresh snags and down wood, and enhancing individual tree structure (in Project 3). In time, these reserves would improve in functioning as refugia for late successional, aquatic and riparian associated and dependent species. In the short term, the fresh snags and down wood created by the project would begin to mitigate the lack of snags and down wood in the watershed. No stream crossing culverts would be used that would potentially hinder movement of aquatic species, therefore no barriers would be created. Both terrestrial and aquatic connectivity would be maintained, and over the long-term, as Riparian Reserves develop late successional characteristics, lateral, longitudinal and drainage connectivity would be restored. <u>Projects 2 & 4</u> Fish habitat and fish passage would be enhanced in the project area, increasing movement up and downstream for fish, and therefore increasing connectivity within and between watersheds. <u>Project 5</u> Over the long term, connectivity for species using large conifers would be enhanced by restoring conifers to the blowdown area. In the short term connectivity would be maintained. **Alternative 2** In the short term, spatial connectivity within and between watersheds would be neither enhanced nor impaired, as current conditions would be maintained. Over the long term, it is possible that connectivity could be lost as canopies close and understory tree and brush species are lost. Fish passage in the culvert in Peak Creek would not be enhanced.

3. Maintain and restore physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.	**Alternatives 1, 3 &4** Project 1 A no cut stream protection zone (SPZ) would maintain the integrity of shorelines, banks and bottom configurations. Criteria used to designate buffers were riparian vegetation, significant slope breaks, active floodplain or high water tables, and areas contributing to stream shading. (EA, p. 38,44 and Appendix A-3) All buffers are a minimum of 50 feet. Trees would be directionally felled within one tree height of the buffers and any part that falls within the buffers would not be yarded out (EA p. 12), thereby preventing disturbance to stream banks and bottom configurations. In the short term, this proposal is unlikely to alter the current conditions of channels in the project area for several reasons: 1) there will be no activities directly in channels, or on streambanks or flood plains, 2) stream flow and sediment delivery are unlikely to be altered due to mitigation measures to filter and redirect any potential runoff, and 3) the supply of large wood in the channel and floodplain will not be altered (EA p. 40). Over the long term, reductions in stand density will likely increase riparian forest health and tree size. This will lead to increased large wood recruitment for stream channels, an important factor in proper channel function. Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat. (EA p. 40) Management activity throughout the project area in all projects is not likely to cause any alteration in water flows that could affect channel morphology. Projects 2, 3 & 4 It is unlikely that any trees felled for Project 3 would fall into Peak Creek, but if any do, they will remain. For all three projects, small, short term increases in turbidity are likely due to bank scouring. However, increases in turbidity would be very short term and a very small amount due to vegetation on stable banks. This increase in turbidity would likely settle out just down stream due to the low depositional nature of this stream (EA p. 52). Project 5 Site preparation and tree planting would occur outside the Riparian Reserves and therefore, there would be no effect whatsoever on shorelines, banks or bottom configurations. **Alternative 2** All projects would be deferred to a later date and therefore there would be no effect on shorelines, banks or bottom configurations.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.	**Alternatives 1 & 3** Project 1 Stream temperature: this proposal is unlikely to have any measurable effect on stream temperatures in project area watersheds. Forest stand density and hence, shading within stream buffers and adjacent to Peak Creek will be left virtually unaltered under this proposal. Shading along other tributaries in the project area is currently adequate (EA p.40). Sedimentation and stream turbidity: tree removal and road renovation and construction would not occur on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action. In addition, potential impacts resulting from tree harvest and road construction/renovation would be mitigated to reduce the potential for measurable sediment delivery to streams, by implementing Best Management Practices. (EA p. 37) Design features and mitigation measures would keep sediment delivery to a minimal level in the proposed swing yarding area. If negative impacts occurred from sediment delivery they would likely be short term and immeasurable and would not affect resident fish in the adjacent streams (EA p. 52) Projects 2, 3 & 4 Stream temperature: an insignificant number of trees would be cut for all projects, therefore there would be no effect on stream shading in adjacent streams. Sedimentation and stream turbidity: Small, short term increases in turbidity are likely due to bank scouring. However, increases in turbidity would be very short term and a very small amount due to vegetation on stable banks. This increase in turbidity would likely settle out just down stream due to the low depositional nature of this stream (EA p. 52-53). In project 3, it is unlikely that any trees would fall into Peak Creek, however if any do they would not be yarded out and any increase in turbidity due to this unlikely event would be very short term and very small. Project 5 Site preparation and conifer planting are not likely to result in measurably direct or indirect effects to water quality hydrologic function and stream channel condition. Some local erosion may result from scalping around planting spots and during tree planting. However, the amount of sediment transport would be minimal and unlikely to reach streams (EA p. 41). **Alternative 2** All projects would be deferred to a later date and there would be no change in water quality in the project area. **Alternative 4** All impacts on water quality would be the same as for Alternatives 1 and 3, except that there would be no tractor swing yarding area and therefore no possibility of sediment delivery from the tractor yarding road.

5. Maintain and restore the sediment regime under which system evolved.	**Alternatives 1 & 3** Project 1 Tree removal would not occur on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action. In addition, potential impacts from tree harvest would be mitigated and, with the implementation of BMPs, are unlikely to contribute measurable amounts of sediment to streams (EA, p. 37). The risks of impacts to water quality due to road construction would be limited by restricting work to periods of low rainfall and runoff. Construction would employ techniques to reduce concentration of runoff and sediment to a minimum, such as minimizing construction, installing cross-drains, and building berms and water-bars on steeper sections of road to prevent runoff channelization (EA p. 38). The main haul routes would likely follow the rocked forest roads for several miles to a paved well-established main route. All new construction would be rocked and outsloped . All new construction would be closed and "winterized" upon project completion, which includes but it not limited to water barring and grass seeding of cut and fill slopes. Timber hauling during periods when water is flowing on roads and into ditches could potentially increase stream turbidity if flows from ditches were large enough to enter streams. The contract administrator would monitor conditions and take steps to mitigate hauling related sediment entry into streams. (EA p. 38) Project design features would maintain the physical integrity of the hill slopes and channel; no alteration of the current sediment regime is expected. Projects 2 & 4 The direct and indirect effects to water quality, hydrological function and stream channel conditions would be near identical to those for Project 1 with the exception of short-term channel condition in the affected streams. In the short term, the addition of large wood may produce some increased turbidity and sedimentation. Over the long term, increased wood can improve channel function and aquatic habitat (EA p. 40-41) Project 3 Direct and indirect effects to water quality, hydrological function and stream channel condition would not be measurably different from Project 1. Project 5 Some local erosion may result from scalping around planting spots and during tree planting. However, the amount of sediment transport would be minimal and unlikely to reach streams. Areas around planting spots would remain vegetated and covered by forest duff, which would trap any loosened soil. In addition, site preparation and conifer planting would occur away from streams (outside of stream buffers). (EA p. 41). **Alternative 4** The ground disturbance caused by construction and repeated crawler trips up and down the skid road would be eliminated by deletion of the tractor swing yarding area in this alternative (EA p.44).

	Alternative 2 All projects would be deferred to a later date and there would be no change in sediment regime from current conditions.
6. Maintain and restore instream flows.	**Alternatives 1, 3, and 4** <u>Project 1</u> Alterations in the capture, infiltration and routing (both surface and subsurface) of precipitation as a consequence of the mechanical removal of trees and reduction in stand density, has been documented on watersheds in the Pacific Northwest and other parts of the world. An extensive study by Bosch and Hewlett (1982) concluded that reductions in forest cover if less than 20 percent cannot be detected by traditional measurements of streamflow. The proposed actions would affect less than 1 percent of the forest cover in the two watersheds [Project area includes 0.02 percent of forest cover in Marys River 5th-field and 0.3 percent of forest cover in the Upper Alsea 5th-field]. Therefore, detectable direct or indirect effects to streamflow as a result of this action are unlikely. (EA p. 37) This action was analyzed for its potential contribution to cumulative effects to streamflow in the Peak Creek and Oliver Creek 6th-field sub-watersheds. The analysis can be found in the NEPA file. <u>Projects 2, 3, 4</u> The cumulative effects analysis for risk of increases to peak flows would not be significantly different from Project 1 (EA p. 40-41). <u>Project 5</u> Project 5 would occur outside the Riparian Reserves and would have no effect on the capture, infiltration or routing of precipitation. **Alternative 2** All projects would be deferred until a later date and instream flows would be maintained in their current condition.

7. Maintain and restore the timing, variability and duration of floodplain inundation and water table elevation in meadows and wetlands.	**Alternatives 1, 3, and 4** Project 1 The proposed thinning would not alter existing patterns of floodplain inundation or water table elevation as it would have no effects or only negligible short-term negative effects on existing flow patterns and stream channel conditions. Field review of channels in the project area found that they are functioning within the range expected for these stream types in the Oregon Coast Range. The minimization of potential disturbances from the proposed project is likely to result in maintenance of project area stream channels in their current condition (i.e., functional) (EA p.40). Over the long term, reductions in stand density would likely increase riparian forest health and tree size. This would lead to increased large wood recruitment for stream channels, an important factor in proper channel function. Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat (EA p.40). There are no meadows or wetlands in the proposed project area. Projects 2 & 4 It is possible that addition of wood to the channel could cause sediment build-up and stream aggradations which could eventually increase stream access its floodplain. This would be a restoration of floodplain inundation. There are no meadows or wetlands in Projects 2 or 4. Project 3 Felling and leaving a small number of trees within 400 feet of Peak Creek would have no effect on the timing, variability or duration of floodplain inundation. There are no meadows or wetlands in Project 3. Project 5 Falling scattered big leaf maples and planting conifers in the upland would have no effect on the timing, variability or duration of floodplain inundation. There are no meadows or wetlands in Project 5. **Alternative 2** All projects would be deferred to a later date and therefore floodplains, wetlands and meadows would remain in their current condition.

8. Maintain and restore the species composition and structural diversity of plant communities in riparian zones and wetlands to provide thermal regulation, nutrient filtering, and appropriate rates of bank erosion, channel migration and CWD accumulations.	**Alternatives 1, 3, and 4** Project 1 Riparian vegetation along streams would be excluded from treatment and designated as stream protection zones. Only the upslope portions of the Riparian Reserves would be included in the density management treatment (EA p.44). All trees would be directionally felled away from streams within one tree height of stream protection buffers and if a cut tree does fall within a stream protection buffer, that part of the tree would remain (EA p.12). Stream buffers and residual trees would continue shading streams. Structural components of late-seral forests (large trees, multiple canopy layers, large hard snags, heavy accumulations of down wood, and species diversity) are generally lacking in the young stands surrounding and including the project area In addition to protecting actual riparian vegetation, the proposed project would restore the species composition and structural diversity of plant communities by enhancing conditions for understory development (structural diversity), increasing the proportion of minor species in the stand (species diversity), increasing growth rates on remaining trees and creating fresh snags and down wood. Projects 2, 3 and 4 There would be little or no change in riparian vegetation on banks or within the riparian zone along streams in these three project areas. Project 5 No site preparation or tree planting would occur within 200 feet of the adjacent stream, therefore riparian plant communities along the adjacent stream would be unaffected. **Alternative 2** All projects would be deferred to a later date and therefore riparian plant communities along streams within the proposed project areas would remain in their current condition.

9. Maintain and restore habitat to support well distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species	**Alternatives 1, 3 and 4** Project 1 Species linked to Riparian Reserves issues are mostly associated with late-seral forest conditions, which would be enhanced within this stand with negligible effects to existing function of the local Riparian Reserves corridors. Habitat to support well distributed riparian-dependent and riparian associated species would be restored by reducing overstocked stands, moderating tree species diversity, altering forest structural characteristics and amending coarse woody debris conditions. Thinning within the Riparian Reserves would enhance stand conditions, growing trees faster than if the stand were to grow naturally. This would increase the potential for high quality instream large woody debris and increase species diversity. (EA p. 52) Project 2 The small jam created by this project would aggrade the step below the culvert, making it easier for fish passage (EA p.52), restoring habitat to support aquatic dependent species. Project 3 Releasing trees to an open grown condition would increase crown ratios and maintain large branches on the largest trees enhancing habitat for riparian and/or late-successional species (EA p.50). Project 4 This project would promote complex and diverse habitat types for fish in the project stream. Dropping trees into the channel would increase complexity and diversity of habitat for resident fish (EA p.53), aquatic invertebrates and riparian-dependent species such as amphibians. Project 5 This project would occur outside of Riparian Reserves and have little effect on riparian-dependent species. **Alternative 2** All projects would be deferred to a later date and therefore riparian conditions in the proposed project areas would remain in their current condition. No habitat would be restored

APPENDIX B-2: GUIDELINES TO REDUCE BARK BEETLE MORTALITY

The following guidelines (from Hostetler, B. and D. Ross. 1996. *Generation of coarse woody debris and guidelines for reducing the risk of adverse impacts by Douglas-fir beetle*. Westside Forest Insect and Disease Technical Center. Unpublished.) should be followed to reduce the probability of Douglas-fir bark beetle (DFB)-caused mortality in residual standing trees in westside forests where live Douglas-fir are being cut for CWD.

1. **Fell and leave the minimum number of trees possible that will allow achievement of CWD objectives**. Remember, the rule-of thumb is that the number of standing trees killed will be about 60 percent of the number that are felled.

2. **Fell the trees no earlier than July and no later than the end of September – the later they can be felled during this period, the better.** This will help insure that the trees are felled after the primary flight of DFB and that some drying of logs will occur so that the logs will be less suitable as host material the following spring.**.**

3. **Staggering the years in which trees are being felled may be beneficial if large numbers of trees are being felled and if enough time is left between felling**. The time period between tree falling should be at least 3 years; 4 would be better. Otherwise, the situation may be exacerbated by allowing beetles to build to even higher population levels.

4. **Monitor what is happening in these stands regarding infestation of down logs and infestation and killing of standing live Douglas-firs.** To date, no data have been collected from areas where silvicultural practices such as this have been used, and any information gathered will be useful under the principles of adaptive management.

5. **If DFB populations are at high levels in the general area because of large amounts of recent blowdown, it would be prudent to postpone felling of CWD trees until populations subsided.** This would be 2 years from the summer in which many discolored trees are present (or 4 years after the first spring following the blowdown), unless there are large amounts of blowdown in subsequent years. If this is the case, one should wait longer. Once the infested trees discolor, the extent and intensity of the previous year's DFB activity can be estimated using the Annual Aerial Insect Detection Survey maps.

6. **If possible, fell tree species other than Douglas-fir for CWD.**

APPENDIX B-3

Table 1-1. Species Included in Survey and Manage Standards and Guidelines and Category Assignment (June 2002)

TAXA GROUP ***Species***	*Note*: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NFP (Table C-3).	**Category**
FUNGI		
Acanthophysium farlowii (Aleurodiscus farlowii)		B
Albatrellus avellaneus		B
Albatrellus caeruleoporus		B
Albatrellus ellisii		B
Albatrellus flettii, In Washington and California		B
Alpova alexsmithii		B
Alpova olivaceotinctus		B
Arcangeliella camphorata (*Arcangeliella* sp. nov. #Trappe 12382; *Arcangeliella* sp. nov. #Trappe 12359)		B
Arcangeliella crassa		B
Arcangeliella lactarioides		B
Asterophora lycoperdoides		B
Asterophora parasitica		B
Baeospora myriadophylla		B
Balsamia nigrens (Balsamia nigra)		B
Boletus haematinus		B
Boletus pulcherrimus		B
Bondarzewia mesenterica (Bondarzewia montana), In Washington and California		B
Bridgeoporus nobilissimus (Oxyporus nobilissimus)		A
Cantharellus subalbidus, In Washington and California		D
Catathelasma ventricosa		B
Chalciporus piperatus (*Boletus piperatus*)		D
Chamonixia caespitosa (*Chamonixia pacifica* sp. nov. #Trappe #12768)		B
Choiromyces alveolatus		B
Choiromyces venosus		B
Chroogomphus loculatus		B
Chrysomphalina grossula		B
Clavariadelphus ligula		B
Clavariadelphus occidentalis (*Clavariadelphus pistillaris*)		B
Clavariadelphus sachalinensis		B
Clavariadelphus subfastigiatus		B
Clavariadelphus truncates (syn. *Clavariadelphus borealis*)		D
Clavulina castanopes v. *lignicola* (*Clavulina ornatipes*)		B
Clitocybe senilis		B
Clitocybe subditopoda		B
Collybia bakerensis		F
Collybia racemosa		B
Cordyceps ophioglossoides		B
Cortinarius barlowensis (syn. *Cortinarius azureus*)		B
Cortinarius boulderensis		B

Cortinarius cyanites	B
Cortinarius depauperatus (*Cortinarius spilomeus*)	B
Cortinarius magnivelatus	B
Cortinarius olympianus	B
Cortinarius speciosissimus (Cortinarius rainierensis)	B
Cortinarius tabularis	B
Cortinarius umidicola (Cortinarius canabarba)	B
Cortinarius valgus	B
Cortinarius variipes	B
Cortinarius verrucisporus	B
Cortinarius wiebeae	B
*Craterellus tubaeformis (*syn. *Cantharellus tubaeformis)*, In Washington and California	D
Cudonia monticola	B
Cyphellostereum laeve	B
Dermocybe humboldtensis	B
Destuntzia fusca	B
Destuntzia rubra	B
Dichostereum boreale (Dichostereum granulosum)	B
Elaphomyces anthracinus	B
Elaphomyces subviscidus	B
Endogone acrogena	B
Endogone oregonensis	B
Entoloma nitidum (Rhodocybe nitida)	B
Fayodia bisphaerigera (Fayodia gracilipes)	B
Fevansia aurantiaca (Alpova sp. nov. # Trappe 1966) (*Alpova aurantiaca*)	B
Galerina atkinsoniana	B
Galerina cerina	B
Galerina heterocystis	E
Galerina sphagnicola	E
Gastroboletus imbellus	B
Gastroboletus ruber	B
Gastroboletus subalpinus	B
Gastroboletus turbinatus	B
Gastroboletus vividus (*Gastroboletus* sp. nov. #Trappe 2897; *Gastroboletus* sp. nov. #Trappe 7515)	B
Gastrosuillus amaranthii (*Gastrosuillus* sp. nov. #Trappe 9608)	E
Gastrosuillus umbrinus (*Gastroboletus* sp. nov. #Trappe 7516)	B
Gautieria magnicellaris	B
Gautieria otthii	B
Gelatinodiscus flavidus	B
Glomus radiatus	B
Gomphus bonarii	B
Gomphus clavatus	B
Gomphus kauffmanii	E
Gymnomyces abietis (*Gymnomyces* sp. nov. #Trappe 1690, 1706, 1710; *Gymnomyces* sp. nov. #Trappe 4703, 5576; *Gymnomyces* sp. nov. #Trappe 5052; *Gymnomyces* sp. nov. #Trappe 7545; *Martellia* sp. nov. #Trappe 1700; *Martellia* sp. nov. #Trappe 311; *Martellia* sp. nov. #Trappe 5903)	B
Gymnomyces nondistincta (*Martellia* sp. nov. #Trappe 649)	B
Gymnopilus punctifolius, In California	B
Gyromitra californica	B

Hebeloma olympianum (Hebeloma olympiana)	B
Helvella crassitunicata	B
Helvella elastica	B
Hydnotrya inordinata (*Hydnotrya* sp. nov. #Trappe 787, 792)	B
Hydnotrya subnix (Hydnotrya subnix sp. nov. #Trappe 1861)	B
Hydropus marginellus (Mycena marginella)	B
Hygrophorus caeruleus	B
Hygrophorus karstenii	B
Hygrophorus vernalis	B
Hypomyces luteovirens	B
Leucogaster citrinus	B
Leucogaster microsporus	B
Macowanites chlorinosmus	B
Macowanites lymanensis	B
Macowanites mollis	B
Marasmius applanatipes	B
Martellia fragrans	B
Martellia idahoensis	B
Mycena hudsoniana	B
Mycena overholtsii	D
Mycena quinaultensis	B
Mycena tenax	B
Mythicomyces corneipes	B
Neolentinus adhaerens	B
Neolentinus kauffmanii	B
Nivatogastrium nubigenum, In entire range except OR Eastern Cascades and CA Cascades Physiographic Provinces	B
Octavianina cyanescens (*Octavianina* sp. nov. #Trappe 7502)	B
Octavianina macrospora	B
Octavianina papyracea	B
Otidea leporina	D
Otidea smithii	B
Phaeocollybia attenuata	D
Phaeocollybia californica	B
Phaeocollybia dissiliens	B
Phaeocollybia fallax	D
Phaeocollybia gregaria	B
Phaeocollybia kauffmanii	D
Phaeocollybia olivacea, In Oregon	F
Phaeocollybia olivacea In Washington and California	E
Phaeocollybia oregonensis (syn. *Phaeocollybia carmanahensis*)	B
Phaeocollybia piceae	B
Phaeocollybia pseudofestiva	B
Phaeocollybia scatesiae	B
Phaeocollybia sipei	B
Phaeocollybia spadicea	B
Phellodon atratus (Phellodon atratum)	B
Pholiota albivelata	B
Podostroma alutaceum	B

Polyozellus multiplex	B
Pseudaleuria quinaultiana	B
Ramaria abietina	B
Ramaria amyloidea	B
Ramaria araiospora	B
Ramaria aurantiisiccescens	B
Ramaria botryis var. *aurantiiramosa*	B
Ramaria celerivirescens	B
Ramaria claviramulata	B
Ramaria concolor f. marrii	B
Ramaria concolor f. tsugina	B
Ramaria conjunctipes var. *sparsiramosa (Ramaria fasciculata* var. *sparsiramosa)*	B
Ramaria coulterae	B
Ramaria cyaneigranosa	B
Ramaria gelatiniaurantia	B
Ramaria gracilis	B
Ramaria hilaris var. *olympiana*	B
Ramaria largentii	B
Ramaria lorithamnus	B
Ramaria maculatipes	B
Ramaria rainierensis	B
Ramaria rubella var. *blanda*	B
Ramaria rubribrunnescens	B
Ramaria rubrievanescens	B
Ramaria rubripermanens In Oregon	D
Ramaria rubripermanens In Washington and California	B
Ramaria spinulosa var. *diminutiva* (*Ramaria spinulosa*)	B
Ramaria stuntzii	B
Ramaria suecica	B
Ramaria thiersii	B
Ramaria verlotensis	B
Rhizopogon abietis	B
Rhizopogon atroviolaceus	B
Rhizopogon brunneiniger	B
Rhizopogon chamaleontinus (*Rhizopogon* sp. nov. #Trappe 9432)	B
Rhizopogon ellipsosporus (*Alpova* sp. nov. # Trappe 9730)	B
Rhizopogon evadens var. *subalpinus*	B
Rhizopogon exiguus	B
Rhizopogon flavofibrillosus	B
Rhizopogon inquinatus	B
Rhizopogon truncatus	D
Rhodocybe speciosa	B
Rickenella swartzii (Rickenella setipes)	B
Russula mustelina	B
Sarcodon fuscoindicus	B
Sedecula pulvinata	B
Sowerbyella rhenana (Aleuria rhenana)	B
Sparassis crispa	D
Spathularia flavida	B

Stagnicola perplexa	B
Thaxterogaster pavelekii (*Thaxterogaster* sp. nov. #Trappe 4867, 6242, 7427, 7962, 8520)	B
Tremiscus helvelloides	D
Tricholoma venenatum	B
Tricholomopsis fulvescens	B
Tuber asa (*Tuber* sp. nov. #Trappe 2302)	B
Tuber pacificum (*Tuber* sp. nov. #Trappe 12493)	B
Tylopilus porphyrosporus (Tylopilus pseudoscaber)	D
LICHENS	
Bryoria pseudocapillaris	A
Bryoria spiralifera	A
Bryoria subcana (syn. *Alectoria subcana*)	B
Bryoria tortuosa, In WA Olympic Peninsula, WA Western Lowlands, OR Willamette Valley Physiographic Provinces ; CA	A
Bryoria tortuosa, In WA Eastern Cascades, OR Eastern Cascades, OR Klamath Physiographic Provinces, Jackson County, OR	D
Buellia oidalea	E
Calicium abietinum	B
Calicium adspersum	E
Calicium glaucellum	F
Calicium viride	F
Cetrelia cetrarioides	E
Chaenotheca chrysocephala	B
Chaenotheca ferruginea	B
Chaenotheca furfuracea	F
Chaenotheca subroscida	E
Chaenothecopsis pusilla (syn. *Chaenothecopsis subpusilla*, *Calcium asikkalense*, *Calcium floerkei, Calcium pusillum, Calcium subpusillum)*	E
Cladonia norvegica	B
Collema nigrescens, In WA and OR, except in OR Klamath Physiographic Province	F
Dendriscocaulon intricatulum In Coos, Douglas, Curry, Josephine, & Jackson Counties, OR; CA	E
Dendriscocaulon intricatulum In the rest of Oregon and all of Washington	A
Dermatocarpon luridum	E
Heterodermia sitchensis	E
Hypogymnia duplicata (syn. *Hypogymnia elongata*)	A
Hypogymnia vittata (Hygomnia vittiata)	E
Hypotrachyna revoluta (syn. *Parmelia revoluta*)	E
Leptogium burnetiae var. hirsutum	E
Leptogium cyanescens	A
Leptogium rivale	E
Leptogium teretiusculum	E
Lobaria linita	A
Lobaria oregana, In California	A
Microcalicium arenarium	B
Nephroma bellum, In OR; Klamath, Willamette Valley, Eastern Cascades; WA; Western Cascades (outside GPNF), Eastern Cascades, Olympic Peninsula Physiographic Provinces	E
Nephroma isidiosum	E
Nephroma occultum	A
Niebla cephalota (syn. *Desmazieria cephaolta, Ramalina cephalota*)	A
Pannaria rubiginosa	E

Pannaria saubinetii	F
Peltigera pacifica	E
Platismatia lacunose	C
Pseudocyphellaria sp. 1 (*Pseudocyphellaria mougeotiana*)	B
Pseudocyphellaria rainierensis	A
Pyrrhospora quernea (syn. *Lecidea quernea, Protoblastenia quernea*)	E
Ramalina pollinaria	E
Ramalina thrausta	A
Stenocybe clavata	E
Teloschistes flavicans	A
Tholurna dissimilis, south of Columbia River	B
Usnea hesperina	E
Usnea longissima, In California and in Curry, Josephine, and Jackson Counties, Oregon	A
Usnea longissima, In Oregon, except in Curry, Josephine, and Jackson Counties and in Washington	F
BRYOPHYTES	
Brotherella roellii	E
Buxbaumia viridis, In California	E
Diplophyllum albicans	F
Diplophyllum plicatum	B
Encalypta brevicolla v. crumiana	B
Herbertus aduncus	E
Iwatsukiella leucotricha	B
Kurzia makinoana	B
Marsupella emarginata v. aquatica	B
Orthodontium gracile	B
Ptilidium californicum, In California	A
Racomitrium aquaticum	E
Rhizomnium nudum	B
Schistostega pennata	A
Tetraphis geniculata	A
Tritomaria exsectiformis	B
Tritomaria quinquedentata	B
VERTEBRATES	
Larch Mountain salamander *Plethodon larselli*	A
Shasta salamander *Hydromantes shastae*	A
Siskiyou Mountains salamander *Plethodon stormi*, In North Range	D
Siskiyou Mountains salamander *Plethodon stormi*, Outside North Range	C
Van Dyke=s salamander *Plethodon vandykei*, Cascade population only	A
Great Gray Owl *Strix nebulosa*	C
Oregon Red Tree Vole *Arborimus longicaudus*, In Central Range)	D
Oregon Red Tree Vole *Arborimus longicaudus*, Outside Central Range)	C
MOLLUSKS	
Ancotrema voyanum	E[3,4]
Cryptomastix devia	A
Cryptomastix hendersoni	A
Deroceras hesperium	B[4]
Fluminicola n. sp. 3	A[2]
Fluminicola n. sp. 11	A[2]

Fluminicola n. sp. 14	A
Fluminicola n. sp. 15	A
Fluminicola n. sp. 16	A
Fluminicola n. sp. 17	A
Fluminicola n. sp. 18	A
Fluminicola n. sp. 19	A[2]
Fluminicola n. sp. 20	A[2]
Fluminicola seminalis	A[2]
Helminthoglypta hertleini	E[4]
Helminthoglypta talmadgei	D
Hemphillia burringtoni	E
Hemphillia glandulosa, In WA Western Cascades Physiographic Province	E
Hemphillia malonei, Washington	C
Hemphillia pantherina	B[4]
Juga (O) n. sp. 2	A
Juga (O) n. sp. 3	A
Lyogyrus n. sp. 1	A
Lyogyrus n. sp. 2	A
Lyogyrus n. sp. 3	A
Megomphix hemphilli, South of south boundary of Lincoln, Benton, and Linn Counties, Oregon	F[5]
Megomphix hemphilli, North of south boundary of Lincoln, Benton, and Linn Counties, Oregon	A
Monadenia chaceana	B[4]
Monadenia fidelis klamathica	B[3,4]
Monadenia fidelis minor	E
Monadenia fidelis ochromphalus	B[3,4]
Monadenia troglodytes troglodytes	A
Monadenia troglodytes wintu	A
Oreohelix n. sp.	A
Pristoloma articum crateris	B[2,4]
Prophysaon coeruleum, In California and Washington	A
Trilobopsis roperi	A
Trilobopsis tehamana	A
Vertigo n. sp.	A
Vespericola pressleyi	A
Vespericola shasta	A
Vorticifex n. sp. 1	E
VASCULAR PLANTS	
Arceuthobium tsugense mertensianae, In Washington only	F
Bensoniella oregana, In California only	A
Botrychium minganense, In Oregon and California	A
Botrychium montanum	A
Coptis asplenifolia	A
Coptis trifolia	A
Corydalis aquae-gelidae	C
Cypripedium fasciculatum, Entire Range	C
Cypripedium montanum, Entire range except Washington Eastern Cascades Physiographic Province	C
Eucephalus vialis (Aster vialis)	A
Galium kamtschaticum, Olympic Peninsula, WA Eastern Cascades, OR & WA Western Cascades Physiographic Provinces, south of Snoqualmie Pass	A

Platanthera orbiculata var. *orbiculata* (*Habenaria orbiculata*)	C
ARTHROPODS	
Canopy herbivores (south range)	F
Coarse wood chewers (south range)	F
Litter and soil dwelling species (south range)	F
Understory and forest gap herbivores (south range)	F

[1] Although Pre-Disturbance Surveys are deemed practical for these species, continuing pre-disturbance surveys is not necessary in order to meet management objectives.

[2] For these species, until Management Recommendations are written, the following language will be considered part of the Management Recommendation: Known and newly discovered sites of these species will be protected from grazing by all practical steps to ensure that the local population of the species will not be impacted.@

FOOTNOTES (continued)

[3] For these species, until Management Recommendations are written, the language Known and newly discovered sites of these species will be protected from grazing by all practical steps to ensure that the local population of the species will not be impacted@ is the Management Recommendation and no other recommendations are imposed at this time.

[4] Based upon direction contained in the ROD, equivalent-effort pre-disturbance surveys are required for these eight mollusk species.

[5] Based upon direction contained in the ROD, these two mollusk species require management of sites known as of 9/30/99.

Appendix B-4

Table 1-2. Species Removed from Survey and Manage, Protection Buffers, and Protect from Grazing in All or Part of Their Range (June 2002)

TAXA GROUP *Note:* where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses is name used in NFP (Table C-3) Species	**1994 NFP Category**	**2001 ROD Category**
FUNGI		
Albatrellus fletti, in Oregon[2]		B
Bondarzewia mesenterica, In Oregon[2]		B
Bryoglossum gracile[1]	1,3	
Cantharellus cibarius	3,4	
Cantharellus formosus	1,3	
Cantharellus subalbidus, In Oregon		D
Chromosera cyanophylla[1]		B
Clavariadelphus borealis	3,4	
Clavariadelphus lovejoyae	3,4	
Clavicorona piperata (*Clavicorona avellanea*)	3	
Clavulina cinerea	3,4	
Clavulina cristata (*Clavulina cinerea*)	3,4	
Cordyceps capitata[1]		B
Craterellus tubaeformis (*Cantharellus tubaeformis*), In Oregon[2]		D
Galerina vittiformis (*Galerina vittaeformis*)[3]		B
Gomphus floccosus, In Oregon and Washington	3	
Gomphus floccosus		F
Gymnopilus punctifolius, In Oregon and Washington[2]		B
Gyromitra esculenta		F
Gyromitra infula[1]		B
Gyromitra melaleucoides[1]		B
Gyromitra montana		F
Helvella compressa	1,3	
Helvella maculata		B
Hydnum repandum	3	
Hydnum umbilicatum		B
Martellia maculata (*Elaphomyces* sp. nov. #Trappe 1038)	1,3	
Martellia monticola	1,3	
Mycena monticola[1]		B
Neournula pouchetti		B
Nivatogastrium nubigenum, In Oregon, E. Cascades; California, Cascades[2]		B
Omphalina ericetorum (*Phytoconis ericetorum*)	3,4	
Otidea onotica		F
Phaeocollybia carmanahensis	1,3	
Pithya vulgaris		D

Plectania melastoma		F
Plectania milleri		B
Rhizopogon parksii (*Rhizopogon* sp. nov. #Trappe 1692; *Rhizopogon* sp. nov. #Trappe 1698)	1,3	
Sarcodon imbricatus		B
Sarcosoma latahense		B
Sarcosoma mexicanum, All of Oregon, except Curry and Josephine Counties[2]	3, PB	
Sarcosoma mexicanum		F
Sarcosphaera coronaria (*Sarcosphaera eximia*)		B
Thaxterogaster pingue	3	
LICHENS		
Calicium adaequatum[1]	4	
Chaenotheca brunneola[1]	4	
Collema nigrescens, In OR Klamath; CA Klamath, and Coast Physiographic Provinces[2]	4	
Cyphelium inquinans[1]	4	
Erioderma sorediatum[1]	1,3	
Heterodermia leucomelos (syn. *Anaptychia leucomelaena, Heterodermia leucomelaena*)[1]	1,3	
Hydrothyria venosa	1,3	
Hypogymnia oceanica		F
Kaernefeltia californica (*Cetraria californica*)[1]	1,3	
Leioderma sorediatum[1]	1,3	
Leptogium brebissonii[1]	1,3	
Leptogium saturninum[1]	4	
Lobaria hallii	1,3	
Lobaria oregana, In Oregon an dWashington[2]	4	
Lobaria pulmonaria	4	
Lobaria scrobiculata	4	
Loxosporopsis corallifera (*Loxospora* sp. nov. "*corallifera*")	1,3	
Mycocalicium subtile[1]	4	
Nephroma bellum, In Oregon, W. Cascades and Coast Range; In Washington, W. Cascades (GPNF only)[2]		F
Nephroma helveticum	4	
Nephroma laevigatum	4	
Nephroma parile	4	
Nephroma resupinatum	4	
Pannaria leucostictiodes	4	
Pannaria mediterranea	4	
Peltigera collina	4	
Peltigeria neckeri[1]	4	
Pilophorus nigricaulis[1]	1,3	

Pseudocyphellaria anomala	4	
Pseudocyphellaria anthraspis	4	
Pseudocyphellaria crocata	4	
Stenocybe major[1]	4	
Sticta arctica[1]	1,3	
Sticta beauvoisii	4	
Sticta fuliginosa	4	
Sticta limbata	4	
Tholurna dissimilis, North of Columbia River[2]	1,3	
BRYOPHYTES		
Antitrichia curtipendula	4	
Bartramiopsis lescurii[1]	1,3	
Buxbaumia viridis, In Oregon and Washington[2]		D
Douinia ovata[1]	4	
MOLLUSKS		
Fuminicola n sp. 1 (1)		A
Fuminicola n. sp. 2 (1)		A
Hemphillia glandulosa, In WA, Olympic Peninsula; In Oregon, Coast Range (2)		C
Hemphillia malonei, In Oregon (2)		C
Monadenia churchi		F
Prophysaon coeruleum, In Oregon[2]	1,2	
Prophysaon dubium	1,2	
Vorticefex klamathensis sinitsini (1)		E
VASCULAR PLANTS		
Allotropa virgata	1,2	
Botrychium minganense, In Washington[2]	1,2	
Clintonia andrewsiana	1,2	
Cypripedium montanum, In Washington, Eastern Cascades (2)		C
Galium kamtschaticum, WA Western Cascades Physiographic Province, north of Snoqualmie Pass[2]	1,2	
Pedicularis howellii[1]	1,2,PG	
Scoliopus bigelovii	1,2	

[1]These species are already on, or are currently being considered for, the Agencies' special status species programs. Known sites for these species will be managed until their disposition is clarified in the special status species consideration.

[2]These species are removed from only part of their range in the Northwest Forest Plan Area.

[3]This fungus generally appears under the name vittaeformis. According to the International Code of Botanical Nomenclature (Art. 73.8) this epithet has been formed in the incorrect manner; the correct form is vittiformis

Note: Where taxa has two names, first name is current accepted name and second one in parentheses is name used in Northwest Forest Plan (Table C-3).

Abbreviations: NFP= Northwest Forest Plan PB= Protection Buffer PG=Protect From Grazing

Appendix C-1: REVIEW SUMMARIES

Environmental Elements Review Summary
The following table summarizes environmental features which the Bureau of Land Management is required by law or policy to consider in all Environmental Documentation (BLM Handbook H-1790-1, Appendix 5: Critical Elements of the Human Environment). Information in the table applies only to the proposed action.

Environmental Feature	Affected/May Be Affected/Not Affected	Remarks
Air Quality	Affected	Pile burning would be accomplished in compliance with the Oregon Smoke Management Plan.
Areas of Critical Environmental Concern	Not Affected	
Cultural, Historic, Paleontological	Not Affected	Survey not required per protocol approved Aug. 1998 (contract suspends operations if discovery)
Prime or Unique Farm Lands	Not Affected	None present
Invasive, Non-native Species	Not Affected	Does not introduce new or increase spread of existing non-native species
Environmental Justice	Not Affected	No impact anticipated
Flood Plains	Not Affected	No development in flood plains
Native American Religious Concerns	Not Affected	
Threatened, Endangered, or Special Status Plant Species or Habitat	Not Affected	No known sites found. See Chapter III Vegetation
Threatened, Endangered, or Special Status Animal Species or Habitat	Wildlife: May Be Affected Fish: May Be Affected	All appropriate mitigation has been incorporated into design features. See Wildlife, Special Status/Attention Species, Chapter III See Fisheries, Section III
Hazardous or Solid Wastes	Not Affected	
Drinking or Ground Water Quality	Not Affected	
Wetlands or Riparian Reserves	Affected	See Riparian, Section III
Wild and Scenic Rivers	Not Affected	
Wilderness	Not Affected	

COMMON ISSUES REVIEW

Resources	Affected/May Be Affected/Not Affected	Remarks
Special Attention Animal Species and Habitat	Affected	All sites found have been protected
Special Attention Plant Species and Habitat	Affected	All sites found have been protected.
Minerals	Not affected	
Land Uses	Not affected	
Soils & Sedimentation	Affected	See Soils section.
Water: **DEQ 303(d) listed streams** **Water Temperature** **Water Quantity**	 Not affected Not affected Not affected	
Rural Interface Areas	Not affected	

Appendix C-2 to EA# OR080-02-03 Mainline Thinning

BENEFICIAL USES REVIEW SUMMARY		
Downstream Beneficial Uses (Salem FEIS 3-9)	**Designated Use (Y/N)?**	**Remarks /References**
Public Water Supply	N	WRIS
Domestic Water Supply	N	WRIS
Irrigation	Y	See EA p.34
Fisheries	Y	See EA p.34
Wildlife	Y	See specialist report.
Recreation	Y	See EA p.34
Maintenance of Aesthetic Quality	Y	See EA p.34
OTHER WATER ISSUES		
Issue/Concern	**Listed (Y/N)**	**Remarks /References**
DEQ 303d listed stream	N	
Key Watershed	N	

*WRIS = Oregon Department of Water Resources

APPENDIX C-3
NEPA IMPACTS ANALYSIS for
LISTED TERRESTRIAL WILDLIFE SPECIES
BLM MARYS PEAK RESOURCE AREA

ACTION: Mainline Thinning & Restoration Project

Species' status as of: February 2003

INVERTEBRATES	SSS	SAS	NEPA ISSUE (Yes or No) / RATIONALE
All Mollusks in RR		RR	No / 1. No-cut buffers (aver. 75ft), post-harvest leave trees (76-200ft), and protection of existing snags and coarse woody debris will maintain enough structure &canopy closure (>50%) to protect microclimates and nesting/foraging resting/escape habitats w/i the Riparian Reserves.
Oregon Giant Earthworm *Driloleirus macelfreshi*	BS		No / 2. No known sites on BLM; live in deep, moist, undisturbed soils of riparian forests, most known sites in Willamette Va.; see 1. above.
Oregon Megomphix *Megomphix hemphilli*	BS	SM	Yes/ 3. Known sites occur within the project area, all sites are closely associated with bigleaf maple and will be protected with no-touch buffers.
Roth's Blind Ground Beetle *Pterostichus rothi*	BS		No / 4. Four known sites (top of Marys Pk , 3 mi. east of Lincoln City, Grass Mt., & Alsea Fish Hatchery); prefers cool-cold, moist, well drained, deep, coarse-crumb soils, under closed canopy conifer forest; entire life-cycle below soil surface, burrows deep during warm, dry periods.

BIRDS	SSS	SAS	NEPA ISSUE (Yes or No) / RATIONALE
Bald Eagle *Haliaeetus leucocephalus*	FT		No / 5. One breeding pair on BLM (Va. of the Giants) in RA; no known sites in or adjacent to the action area.
Harlequin Duck *Histrionicus histrionicus*	BA		No / 6. No known breeding populations in RA; occasional pairs seen during breeding season on Coast Range rivers, see 1. above.
Marbled Murrelet *Brachyramphus marmoratus*	FT		Yes / 7. Noise disturbance within 0.25 mile of unsurveyed potential habitat may affect breeding birds.
Northern Goshawk *Accipiter gentilis*	BS		No / 8. No known sites on BLM; rare to very rare west of the Cascades, no known breeding populations in the Coast Range.
Northern Spotted Owl *Strix occidentalis caurina*	FT		Yes / 9. Thinning may affect the quality of dispersal habitat.
Oregon Vesper Sparrow *Pooecetes gramineus affinis*	BS		No / 10. No known sites on BLM; prefers open areas within or adjacent to oak savannah or open mixed conifer/hardwood forests; not a conifer forest species.
American Peregrine Falcon *Falco peregrinus anatum*	SE/BS		No / 11. No known nest sites on BLM in R.A., best nesting habitat occurs along coast, in Portland, and in Columbia Gorge.
Purple Martin *Progne subis*	BS		No / 12. Known to occur on BLM lands; prefers large snags within early-seral (0-39 years) habitat.

MAMMALS	SSS	SAS	NEPA ISSUE (Yes or No) / RATIONALE
All Bats in RR		RR	No / 13. See 1. above.
American Marten *Martes americana*		RR	No / 14. No known sites on BLM; rare in the north half of the Coast Range; see 1. above; leave trees and coarse woody debris may provide suitable dispersal habitat in the uplands.
California Wolverine *Gulo gulo luteus*	ST		No / 15. EXTIRPATED from Coast Range since before 1936.
Fringed Myotis *Myotis thysanodes*	BA	RR/BRS	No / 16. Expected to occur on BLM; see 1. above; leave trees, snags, stumps, and coarse woody debris is expected to provide suitable nesting and foraging habitats in the uplands; no known abandoned wooden bridges or buildings in or adjacent to the action area.
Long-Eared Myotis *Myotis evotis*		RR/BRS	No / 17. See 16. above.
Long-Legged Myotis *Myotis volans*		RR/BRS	No / 18. See 16. above.
Pacific Fisher *Martes pennanti pacifica*	BS		No / 19. See 14. above.
Red Tree Vole *Arborimus longicaudus*		RR/SM	No / 20. Surveys to protocol were completed were necessary and no active red tree vole nests were found.
Silver-Haired Bat		RR/BRS	No / 21. See 16. above.
Townsend's Big-Eared Bat *Corynorhinus townsendii townsendii*	BS	RR/BRS	No / 22. No known sites on BLM; no known caves, mines, or cave-like structures in the RA.
Yuma Myotis *Myotis yumanensis*		RR/BRS	No / 23. See 16. above.
AMPHIBIANS	**SSS**	**SAS**	**NEPA ISSUE (Yes or No) / RATIONALE**
All Amphibians in RR		RR	No / 24. See 1. above.
N. Red-Legged Frog *Rana aurora aurora*	BA	RR	No / 25. Known to occur on BLM lands; see 1. above; leave trees and coarse woody debris is expected to provide suitable dispersal habitat in the uplands.
Oregon Spotted Frog *Rana pretiosa*	FC	RR	No / 26. EXTIRPATED from Willamette Va. since about 1940; prefers springs, ponds, lakes, and sluggish streams which are associated with nonwoody wetland plant communities.
Tailed Frog *Ascaphus truei*	BA	RR	No / 27. Known to occur on BLM lands; see 25. above.
REPTILES	**SSS**	**SAS**	**NEPA ISSUE (Yes or No) / RATIONALE**
Western Painted Turtle *Chrysemys picta bellii*	BS		No / 28. No known sites on BLM; prefers marshes, slow rivers, ponds and lakes with large amounts of aquatic vegetation and with a muddy or sandy substrate.
Western Pond Turtle *Clemmys marmorata marmorata*	BS		No / 29. No known sites on BLM; rare in the Willamette Va. north of Eugene; prefer marshes, ponds, lakes, and quiet rivers with large amounts of emergent logs or boulders for aggregate basking.

SSS=Special Status Species in order of priority (they are mutually exclusive):

***Endangered Species Act Listings*: FE=Federal Endangered; FT=Federal Threatened; FPE=Federal Proposed Endangered; FPT=Federal Proposed Threatened; FC=Federal Candidate Species**

***Oregon Dept. of Fish & Wildlife Listings*: SE=State Endangered; ST=State Threatened**

***BLM Listings*: BS=Bureau Sensitive**

***OR/WA BLM State Office Listings*: BA=Bureau Assessment**

SAS=Special Attention Species:

Northwest Forest Plan Listings: RR=Riparian Reserve Species; SM=Survey & Manage Species; BRS=Bat Roost Site Species

NEPA ISSUE: No=No substantial impact(s) to the species or its habitat from the proposed action, no further evaluation in EIS/EA is necessary; Yes=impact(s) to species or its habitat occur and further evaluation is necessary in EIS/EA issues analysis